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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
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NATIONAL MARINE FISHERIES SERVICE
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FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

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0.11 (0.12)(0.8) ENGINEERING PROBLEMS IN THE DESIGN AND OPERATION OF PHYTOTRONS

Downs, R. J., H. Hellmers (Botany & Horticultural Science, North Carolina State University, Raleigh, NC 27607), and P. J. Kramer (Duke University, Durham, NC 27706)
ASHRAE (Heating, Refrigerating and Air-Conditioning) Journal 14, No. 6, 47-55 (June 1972)

Phytotrons are laboratories containing precisely controlled environment chambers and greenhouses used to study effects of temperature, humidity, light, and other factors on plant growth. The phytotron requires a building to house it and the mechanical equipment necessary to maintain it. A phytotron unit was constructed at Duke and at North Carolina State Universities. The history of planning, financing, and construction of these units and the architectural and engineering criteria which were established during the planning stage have been published elsewhere. After the phytotrons had been in operation for 3 years, the authors prepared a critique that showed the errors and successes in design and construction that had become apparent.

The authors conclude that a large amount of time spent in planning and checking specifications prior to construction (and close supervision during construction) was rewarded in terms of efficient operation of the phytotron. However, greater vertical flexibility in the building should have been provided, in addition to improved ease of maintenance by better accessibility to mechanical components, grease fittings, and air vents.

[8 figures, 1 table, 7 references] SW

0.35 RECENT PHYSICAL STUDIES OF THE STRUCTURE OF BIO-MEMBRANES

Chapman, D. (editor)
Chemistry and Physics of Lipids 8, No. 4, 259-404 (May 1972)

This conference on recent physical studies of the structure of bio-membranes, held on October 28-30, 1971, in Titisee, was organized by D. Chapman, Chemistry Department of the University, Sheffield. This issue of the journal contains the reports presented at the conference including a summary of the discussion that followed the presentation of each report. In the preface the editor states that physical techniques are being widely used in the study of the structure and function of biological membranes and that the aim of the conference was to bring together the research workers most active in this area of research to discuss their latest findings. Some of the important topics discussed in the 19 articles were (1) interpretation of freeze-etch electron micrographs, (2) the phase problem associated with X-ray studies of membranes, (3) feasibility of determining the amount of bilayer present in a membrane by X-ray methods, (4) organization of the protein in the membrane, (5) possibility of using spin probes for studying phase transition membranes, (6) artifacts present in interpretation of CD spectra of membranes, and (7) the possibility of obtaining satisfactory spectra from non-sonicated membranes. FTP

0.36 LIPID METABOLISM DURING COLD-EXPOSURE AND DURING COLD-ACCLIMATION

Himms-Hagen, Jean (Department of Biochemistry, University of Ottawa, Ottawa, Ontario, Canada K1N 6N5)
Lipids 7, No. 5, 310-323 (May 1972)

This review article deals with the role of lipid metabolism in the regulatory mechanisms for increasing heat production in the cold. In particular, the roles of two lipid-storing tissues (the white adipose tissue and the brown adipose tissue) are considered. The author describes three roles for these tissues as follows: (1) provision of substrate to support the increased metabolic rate (involving white adipose tissue and brown adipose tissue), (2) heat production (brown adipose tissue), (3) maintenance of the adaptive state needed for an animal to be able to use nonshivering thermogenesis (brown adipose tissue). The discussion deals first with changes in lipid metabolism occurring in response to cold-exposure and on the role of the white adipose tissue in shivering thermogenesis. Then, the nature of nonshivering thermogenesis, together with the roles of the brown adipose tissue, is discussed.

[1 figure, 1 table, 138 references] FTP

0.33 EFFECT OF ESSENTIAL AMINO ACIDS ON ABSORPTION OF PHENYLALANINE BY RAT INTESTINE

Casey, M., and B. Blane (Swiss Fed., Dairy Res. Stn., Liebefeld-Bern, Switzerland) Chemical Abstracts 76, No. 19, 110834b (May 8, 1972)

0.4 (0.5) PERMEABILITY AND ENTEROTOXIC FACTORS OF NONAGGLUTINABLE VIBRIOS VIBRIO ALCALIGENES AND VIBRIO PARAHAEMOLYTICUS

Bhattacharya, S., A. K. Bose, and A. K. Ghosh (Cholera Research Centre Indian Council of Medical Research, Calcutta-16, India)
Applied Microbiology 22, No. 6, 1159-1161 (Dec. 1971)

Earlier work has indicated that nonagglutinable vibrios (NAG), strains of V. alcaligenes, and V. parahaemolyticus (apart from V. cholerae) can produce the clinical syndrome of cholera. The pathophysiological changes that occur in cholera involve a cell-free exotoxin elaborated by the organism V. cholerae containing two principal factors: (1) an enterotoxic factor that is responsible for the initiation of accumulation of fluid in the gut of humans and experimental animals and (2) a permeability factor (skin toxin) that produces increased vascular permeability in the skin of experimental animals. Little is known about the toxin (if any) of other organisms implicated in acute cases simulating cholera, nor is it known whether similar enterotoxic factor and permeability factor are elaborated by these other organisms. Thus, the present study was carried out to determine whether the enterotoxic factor (EF) and the permeability factor (PF) were elaborated by nonagglutinable vibrios (34 strains were examined), V. alcaligenes (7 strains), and V. parahaemolyticus (4 strains). Guinea pigs and rabbits were used in this experimental work.

Some strains of nonagglutinable vibrios are capable of elaborating cell-free toxin containing the enterotoxic factor; also, the EF can be induced in strains of nonagglutinable vibrios by animal passage. The NAG strains did not show presence of the permeability factor (skin toxin), suggesting that the EF is the primary

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0.33 CHROMOSOMAL PROTEINS IN THE DINOFLAGELLATE ALGA (GYRODINIUM COHNII)

Rizzo, Peter J., and Larry D. Noodén (Botany Department, University of Michigan, Ann Arbor, MI 48104)
Science 176, No. 4036, 796-797 (May 19, 1972)

[All living cells are basically similar in structure and organization, having similar functional subunits--for example, the nucleus. Through a process of evolution some of these subunits have been modified. An example of a modification is that of the nucleus containing the genetic material deoxyribonucleic acid (DNA). In the more highly evolved corn root cell, DNA is located in the cell in a clearly defined nucleus enclosed in a nuclear membrane. This higher evolutionary form is termed a eukaryote. In primitive evolutionary forms such as bacteria, the nucleus is not enclosed in a membrane, and the cell is called a prokaryote. The ratio of the amount of protein to the amount of DNA in chromatin (from chromosomes) in the nucleus is another factor used in distinguishing eukaryotes from prokaryotes. Abstractor's note]

Experiments were performed on chromosomes of dinoflagellate G. cohnii in the analysis of structure and the regulation of gene action in eukaryotes. Results of the investigation showed that the ratio of the amount of protein to the amount of DNA is higher in the dinoflagellate than the ratio found in prokaryotes and lower than the ratio found in eukaryotes. The authors suggest that the nuclear organization of dinoflagellates is intermediate in evolutionary development between prokaryotes and eukaryotes. In addition, small amounts of acid-soluble protein (which may be histone) found in the chromatin are not as important in gene repression in prokaryotes as they may be in eukaryotes.
[1 figure, 1 table, 25 references] SW

0.4 (0.5)

factor for induction of cholera syndrome and that PF does not play an important role. V. parahaemolyticus showed presence of PF but not EF, suggesting that the pathogenicity of these organisms is quite different from that of NAG agglutinable vibrios. EF and PF were absent in the strains of V. alcaligenes.
[2 tables, 9 references] FTP

0.36 CHOLESTEROL METABOLISM IN AORTA AND IN TISSUE CULTURE

Kritchevsky, David (The Wistar Institute of Anatomy and Biology, Philadelphia, PA 19104)
Lipids 7, No. 5, 305-309 (May 1972)

This article is a review of information on metabolism of cholesterol in aorta and in tissue culture. Such information is of interest in the field of atherosclerosis research. According to the definition by the World Health Organization, atherosclerosis is a variable combination of changes of the intima of arteries (as distinct from arterioles) consisting of the focal accumulation of lipids, complex carbohydrates, blood and blood products, fibrous tissue, and calcium deposits, and associated with medial changes. FTP

0.118 A TEXTUROMETER FOR MEASURING THE TOUGHNESS OF COOKED FISH (7.89)

Main, G., R. I. Ross, and A. H. Sutton
Lab. Pract. 21, No. 3, 185-188 (1972)
BFMIRA Abstracts 25, No. 5, Abstract No. 1586, 322 (May 1972)

The texture of fish consists of two parameters, succulence and hardness. An improved penetrometer which is suitable for research or commercial use is described. The experiments show that it is possible to obtain a very high correlation between a penetrometer and organoleptic measurement of toughness in cooked fish. Diagrams of the instruments, a circuit diagram and a list of components are given. J.A.D. Reprinted

0.32 DENATURATION OF FISH MUSCLE PROTEIN DURING DEHYDRATION

Suzuki, Taneko (Tokai Reg. Fish. Res. Lab., Tokyo, Japan)
Chemical Abstracts 76, No. 19, 110544g (May 8, 1972)

0.39 BACTERIOPHAGE T7

Studier, F. William (Brookhaven National Laboratory, Upton, NY 11973)
Science 176, No. 4033, 367-376 (Apr. 28, 1972)

Bacteriophages are among the simplest biological entities known, and they carry out basic biological processes that are common to the most complex organisms. In genetic studies, phage systems are selected because they are easier to manipulate genetically than more complex systems. Mutations can be obtained in any phage function and biochemical analysis of mutant strains can often reveal the molecular interactions that make up a biological process. Phage T7 was selected for study because it is of manageable size. Experiments were performed to find a mutation in each of its genes, to determine the function of each of its proteins, and to define the molecular details of the processes directed by T7 after it infects a bacterium.

Twenty-five mutations were found, and proteins specified by 23 of these mutant genes were identified. These genes accounted for 90% of T7 DNA coding capacity. In addition, three classes of genes were distinguished. Class I and II genes seem to be concerned with control of gene expression and breakdown of host DNA and synthesis of T7 DNA. The proteins of the mature phage particle are specified by class III genes.

Further studies using T7 phage will explore molecular mechanisms underlying control of gene expression, synthesis of DNA, genetic recombination, and the assembly of virus particles.
[3 figures, 1 table, 53 references] MS

0.4 (2.9) MARINE PHARMACOLOGY: MODE OF ACTION OF TOXINS ON EXCITABLE TISSUES [BIOCHEMICAL SOCIETY SYMPOSIUM]

[Authors and titles listed below]
Federation Proceedings 31, No. 3, 1115-1149 (May-June 1972)
Card A

"Introduction," by Toshio Narahashi (Department of Physiology and Pharmacology, Duke University Medical Center, Durham, NC 27710), ibid., pp. 1115-1116.

Inasmuch as about four-fifths of the Earth's animals live in or on the seas and perhaps a few thousand of the species contain toxic substances, it is conceivable that many potentially useful drugs may be found in marine sources. The topics of this symposium on marine pharmacology were limited to those dealing with the mechanism of action of marine toxins on excitable tissues. Certain toxins (and venoms) are useful tools to the study of physiology and pharmacology. Not only are they extremely potent, but they exert high specific actions. Puffer fish toxin (tetrodotoxin), for example, at very low concentrations specifically inhibits the increase in sodium permeability of nerve membranes, the key mechanism of nerve excitation, without any effect on other excitation parameters. The chemical is now being used as a tool for studies of neurophysiology and neuropharmacology.

The toxins considered in this symposium are tetrodotoxin, saxitoxin, batrachotoxin, ciguatoxin, and saponins. Batrachotoxin is from the Colombian arrow-poison frog living in jungles; the frog is an aquatic species but not of marine origin. This toxin was included in the Symposium because of its highly important characteristics in interpreting the mode of action of marine toxins on excitable tissues. Each of the toxins discussed is either being used as a pharmacological tool or is expected to be developed into a useful tool or into medical application. [2 figures, 28 references]

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0.4 (2.9) MARINE PHARMACOLOGY: MODE OF ACTION OF TOXINS ON EXCITABLE TISSUES [BIOCHEMICAL SOCIETY SYMPOSIUM]

[Authors and titles listed below]
Federation Proceedings 31, No. 3, 1115-1149 (May-June 1972)

Card B

"The Mode of Action of Batrachotoxin," by E. X. Albuquerque (Department of Pharmacology, School of Medicine and Dentistry, State University of New York at Buffalo, Buffalo, NY 14214), ibid., pp. 1133-1138.

Amphibians have developed a variety of cardiotoxic and neurotoxic compounds that are involved in the defense mechanism of these animals. Batrachotoxin is found in the skin secretions of the small frog Phyllobates aurotaenia from Colombia, South America.

The compound is a 20α ester of batrachotoxinin A with 2,4-dimethylpyrrole-3-carboxylic acid. The toxin causes a selective increase in sodium permeability in a variety of electrogenic membranes. [12 figures, 21 references]

"Mode of Action of Ciguatoxin," by M. D. Rayner (Department of Physiology, University of Hawaii School of Medicine, Honolulu, HI 96822), ibid., pp. 1139-1145.

The author indicates that the pharmacological actions of ciguatoxin appear to be related to its direct effects on excitable membranes rather than to its previously reported anticholinesterase properties in vitro. [7 figures, 1 table, 31 references]

"Mode of Action of Marine Saponins on Neuromuscular Tissues," by S. L. Friess (Environmental Biosciences Department, Naval Medical Institute, Bethesda, MD 20014), ibid., pp. 1146-1149.

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0.5 (2.05) ENRICHMENT, ISOLATION, AND CULTURAL CHARACTERISTICS OF MARINE STRAINS OF CLOSTRIDIUM BOTULINUM TYPE C

Segner, W. P., C. F. Schmidt, and J. K. Boltz (Metal Division Research and Engineering, Continental Can Co., Inc., Chicago, IL 60620)
Applied Microbiology 22, No. 6, 1017-1024 (Dec. 1971)

Clostridium botulinum type C is usually associated with animal botulism, but one human outbreak occurred in California in 1950. The known strains of the organism are nonproteolytic and thus are similar to those botulinum types capable of low-temperature growth--only type E and nonproteolytic types B and F possess psychrophilic characteristics. Because type C is present in the marine environment, it might also exhibit low-temperature growth ability. The authors, therefore, isolated four strains of C. botulinum type C from marine sediments and determined certain cultural and biochemical characteristics of these strains.

Egg meat medium fortified with 1% additions of yeast extract, ammonium sulfate, and glucose (FEM medium) was used to recover the four marine type C isolates from inshore marine sediments collected along the Atlantic, Gulf of Mexico, and Pacific Coasts of the United States. The cultures showing type C toxin were repeatedly transferred into FEM medium and then purified by a deep tube method. The purification medium was beef infusion-agar supplemented with 0.14% sodium bicarbonate and 0.1% L-cysteine hydrochloride (L-cysteine was used because some lots of sodium thioglycolate inhibit growth of C. botulinum type C). The addition of sodium bicarbonate to beef infusion agar increased the viable spore counts of the marine and terrestrial strains of type C organisms. The cultural and biochemical characteristics of the marine strains were compared with those of terrestrial strains. Both groups showed similar characteristics, with the exception of some

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0.5 TAXONOMY OF AEROBIC MARINE EUBACTERIA

Baumann, Linda, Paul Baumann, M. Mandel, and Richard D. Allen (Department of Microbiology, University of Hawaii, Honolulu; HI 96822, and Department of Biology, University of Texas, M. D. Anderson Hospital and Tumor Institute of Houston, TX 77025)
Journal of Bacteriology 110, No. 1, 402-429 (Apr. 1972)

This study is a beginning in the taxonomic characterization of gram-negative, flagellated, nonfermentive bacteria of marine origin. The 218 strains of marine bacteria examined were either straight or curved rods and were motile by means of polar or peritrichous flagella. The various strains were able to utilize from 11 to 85 carbon compounds. On the phenotypic similarities, the various strains were clustered into 22 groups.

The groups having peritrichous flagella were assigned the genus Alcaligenes. The groups having polar flagella and a GC content (moles percent guanine plus cytosine content in the deoxyribonucleic acid) of from 43.2 to 48.0 moles % were placed in a newly created genus Alteromonas; those polarly flagellated groups having a GC content of from 57.8 to 64.7 moles % were placed in the genus Pseudomonas; and the groups that remained were left unassigned. Eleven groups were designated as follows: Altermonas communis, A. vaga, A. macleodii, A. marinopraesens, Pseudomonas doudoroffi, P. marina, P. nautica, Alcaligenes pacificus, A. cupidus, A. venustus, and A. aestus.
[46 figures, 6 tables, 55 references] FTP

0.4 (2.9)

Saponins are found in certain poisonous species of marine echinoderms (particularly sea cucumbers and starfishes). The structural characteristics of these steroidal saponins consist of: (1) a complex steroid nucleus, (2) a series of closely related sugars attached glycosidically to the 3-position of the steroid, and (3) a negative charge locus imparted by esterification of a sugar hydroxyl group with a sulfuric acid moiety. This paper discusses the interactions of these steroidal saponins with neuromuscular tissues under normal and stressful environmental conditions. [6 figures, 10 references] FTP

0.5 (2.05)

HEAT RESISTANCE OF SPORES OF MARINE AND TERRESTRIAL STRAINS OF CLOSTRIDIUM BOTULINUM TYPE C

Segner, W. P., and C. F. Schmidt (Metal Division Research and Engineering, Continental Can Co., Inc., Chicago, IL 60620)
Applied Microbiology 22, No. 6, 1030-1033 (Dec. 1971)

The only comprehensive report on the heat resistance of C. botulinum spores of seven type C strains was published in 1924 (I. A. Bengston, U.S. Public Health Service Hygiene Laboratory Bulletin, No. 136, pp. 1-97 (1924)]. The present study, therefore, examined the heat resistance of spores of four marine and two terrestrial strains of C. botulinum type C.

The heat resistance was determined in Sørensen's phosphate buffer (0.067 M, pH 7.0). The inoculum level was 10^6 spores per tube with 10 replicate tubes for each time-temperature variable. Various time-temperature combinations were carried out to obtain survivors in some fraction of the replicates. The surviving spores were recovered at 30° C. (85° F.) using beef infusion broth containing 1% glucose, 0.10% L-cysteine hydrochloride, and 0.14% sodium bicarbonate. D values (time in minutes at a specified temperature to cause a tenfold reduction in spore count) were calculated for each fractional survivor end point after 6 months of incubation. The D value data was used to construct thermal resistance curves of the spores.

The D_{220} (104° C.) values for the spores of the two terrestrial strains of C. botulinum type C equaled 0.90 min. for the one and 0.40 min. for the other. The D_{220} (104° C.) values for spores of four marine strains of C. botulinum type C equaled 0.12 min. for the first, 0.04 min. for the second, 0.02 min. for the third, and 0.08 min. for the fourth. The z values for the thermal resistance curves of the various strains ranged from 9.0° F. to 11.5° F. (5.0° to 6.2° C.). [The z value is the difference in temperature between two points on the thermal death time curve that differ by a multiple of 10 on the time scale.]
[1 figure, 4 tables, 6 references] FTP

0.4 (2.9)

"Pharmacology of Tetrodotoxin and Saxitoxin," by C. Y. Kao (Department of Pharmacology, State University of New York Downstate Medical Center, Brooklyn, NY 11203), ibid., pp. 1117-1123.

Tetrodotoxin is found in the greatest quantities in the gonads of some fish of the suborder Gymnodontes. Some members of this suborder are responsible for the clinical poisoning known as puffer fish poisoning. Also, the toxin is found in some newts of the family Salamandridae.

Saxitoxin is found in various types of shellfish that are responsible for paralytic shellfish poisoning. Recently, a gonyaulax toxin was purified from an axenic culture of the dinoflagellate alga Gonyaulax, and the toxin was found to be identical, chemically, to saxitoxin.

Tetrodotoxin and saxitoxin are chemically different. Tetrodotoxin is an aminoperhydroquinazoline compound; it has a guanidinium moiety. The structure of saxitoxin is not known but it is believed to have one or two guanidinium groups. The two toxins possess nearly identical biological actions; they both interfere with the early, transiently open ionic channel through which pass Na^+ ions in most common excitable membranes. [3 figures, 35 references]

"Mechanism of Action of Tetrodotoxin and Saxitoxin on Excitable Membranes," by Toshio Narahashi, ibid., pp. 1124-1132.

The author indicated that the puffer fish poison tetrodotoxin is unique in its selective blocking action on the nerve membrane sodium conductance increase, the mechanism whereby an action potential is produced on stimulation. It selectively blocks the ionic channels through which sodium ions flow during the rising phase of the action potential or during the peak transient current under voltage-clamp conditions. Saxitoxin has the same action as tetrodotoxin has on the nerve membrane. [13 figures, 1 table, 81 references]
[Continued on Card B]

0.5 (2.05)

variations in fermentation patterns. The terrestrial strains attacked only glucose and mannose (23 fermentable compounds were tested). The marine strains of C. botulinum type C fermented actively glucose, mannose, galactose, and ribose; they fermented weakly dextrin, inositol, maltose, and melibiose. The authors conclude that the marine and terrestrial strains appear to be closely related and that only moderate differences in fermentation patterns separate the two groups of strains. Even so, they indicate, the significance of these differences may be questionable because widely variable patterns have been reported in the literature. [9 tables, 28 references] FTP

0.5 FORMATION AND DEGRADATION OF NITRITE IN NITRATE CONTAINING FOODS. II. COMMUNICATION: THE EFFECTS OF NATURAL AND ARTIFICIAL MIXTURES OF ORGANISMS

Selenka, F.
Zentbl. Bakt. Parasitkde, 1 Abt. Orig. B., 155, No. 1, 58-69 (1971) (In German, English abstract)
BFMIRA Abstracts 25, No. 6, Abstract No. 1998, 404 (June 1972)

The author found that when pure or artificial mixtures of E. coli with other organisms were used, the same characteristic pattern of nitrate reduction and nitrite decomposition resulted. Pseudomonas spp. in mixed cultures were unable to degrade nitrite and B. subtilis was similarly inhibited by the presence of enterococci. The author found there were two types of nitrate to nitrite reduction. That primarily due to the activity of E. coli resulted in the formation of nitrite which was rapidly degraded. In the other type of reduction caused by a mixture of aerobic spore-formers with very few coli present, the nitrite formed is very slowly degraded and may be present for several days. L.P. Reprinted

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0.4 MERCURY AND HEAVY METALS IN FOOD. PART II.

Anonymous
Br. Fd J. 74, No. 847, 37-38, 44 (1972)
BFMIRA Abstracts 25, No. 6, Abstract No. 2069, 418 (June 1972)

The toxicity of methyl mercury is briefly discussed and the Total Diet Study at present being carried out in the U.K. to assess the average dietary intake of pesticides, which provides a means of estimating mercury intake is described in some detail. D.M.L. Reprinted

0.5 (2.05) MINIMAL GROWTH TEMPERATURE, SODIUM CHLORIDE TOLERANCE, pH SENSITIVITY, AND TOXIN PRODUCTION OF MARINE AND TERRESTRIAL STRAINS OF CLOSTRIDIUM BOTULINUM TYPE C

Segner, W. P., C. F. Schmidt, and J. K. Boltz (Metal Division Research and Engineering, Continental Can Co., Inc., Chicago, IL 60620)
Applied Microbiology 22, No. 6, 1025-1029 (Dec. 1971)

Because type C Clostridium botulinum exists in marine environments and because of its cultural similarity to botulinum types known to possess low-temperature growth ability, the authors surmised that marine strains of type C might show psychrophilic growth characteristics. The primary purpose of this study, then, was to compare the minimal growth temperatures of marine and terrestrial strains of C. botulinum type C. At the same time, examination was made of the sodium chloride tolerance, pH sensitivity, and toxin-producing ability in various culture media of these organisms. Four marine strains and two terrestrial strains of C. botulinum were used.

The minimal growth temperatures of the organisms were determined in a laboratory culture medium, in fortified egg meat medium (FEM), and in ground haddock. Five-tube replicate sets were used, with an inoculum of 2×10^6 viable spores per tube. To reduce toxin carryover, the spores were preheated in an aqueous suspension at 71° C. for 15 min. before they were inoculated into the tubes. The four marine and two terrestrial strains grew at 15.6° C.; only the terrestrial strains grew at 12.8° C.; and none of the strains grew at 10° C. during prolonged incubation.

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0.5 (2.05) CLOSTRIDIUM BOTULINUM IN SEDIMENTS FROM THE CANADIAN ATLANTIC SEABOARD

Laycock, R. A., and A. A. Longard (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)
Journal of the Fisheries Research Board of Canada 29, No. 4, 443-446 (Apr. 1972)

Certain preservation processes for fish and shellfish (pasteurization of crab and shrimp meat and low-level irradiation of fish fillets) rely upon adequate refrigeration of the product to prevent growth of pathogens possibly unaffected by the treatment. An understanding of the potential botulism hazard from such products requires knowledge of the distribution of the causative organism C. botulinum in the environment. In the present study, an examination was made of the occurrence of C. botulinum types on the continental shelf off eastern Canada. 251 bottom samples from 107 sampling stations were collected from the continental shelf off Nova Scotia and 65 bottom samples from 27 stations off Newfoundland using a gravity corer and a pipe dredge.

Types B, C, and E of C. botulinum were found in the bottom samples from the continental shelf off Nova Scotia; types B and E were found only in low concentrations, but localized areas of high concentrations of type C were found. Type E was found off Newfoundland with high incidence of the organism occurring as far as 105 miles off the northeast coast. In general, C. botulinum seemed to be absent from the shallower bank areas but was present in the deeper waters within and bordering upon the continental shelf.

Because of the variation in the distribution of C. botulinum in this marine environment, the extent of the occurrence of the organism in fish and shellfish

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0.5 RELATIONSHIPS OF TEMPERATURE AND SODIUM CHLORIDE CONCENTRATION TO THE SURVIVAL OF VIBRIO PARAHAEMOLYTICUS IN BROTH AND FISH HOMOGENATE

Covert, Donna, and Margy Woodburn (Departments of Foods and Nutrition and Home Economics Research, Oregon State University, Corvallis, OR 97331)
Applied Microbiology 23, No. 2, 321-325 (Feb. 1972)

Vibrio parahaemolyticus is a major cause of gastroenteritis in Japan, and four outbreaks may have been identified in the United States. The organism has been isolated from coastal water and from fish of the United States. It may, therefore, be of potential concern.

Many of the foods implicated in Japanese outbreaks were marine fish and salted vegetables. V. parahaemolyticus is halophilic, and it is possible that certain optimal salt concentrations may enhance cellular resistance to stress conditions (such as temperature). The purpose of the present study was to determine the survival of V. parahaemolyticus in Trypticase soy broth (TSB) and in fish homogenate, with various concentrations of salt and during heating and low-temperature storage. Three strains of the organism were used; two from Japanese sources and one from a United States source. Trypticase soy broth was used as the basic system. A frozen and thawed homogenate composed of sturgeon, ling cod, and black rockfish was used as the food system. NaCl was added to both systems at 3, 6, 9, and 12% levels. The temperature levels used were 48° ±1° C., 5° ±1° C., -5° ±1° C., and -18° ± 1° C. Sampling times were appropriate for the temperature levels used.

The cells of V. parahaemolyticus suspended in TSB (without added NaCl) were readily killed. When the cells were suspended in TSB containing NaCl and exposed

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0.5 (2.05) PRODUCTION OF TYPES A AND B SPORES OF CLOSTRIDIUM BOTULINUM BY THE BIPHASIC METHOD: EFFECT ON SPORE POPULATION, RADIATION RESISTANCE, AND TOXIGENICITY

Anellis, Abe, D. Berkowitz, D. Kemper, and D. B. Rowley (Food Laboratory, Microbiology Division, U.S. Army Natick Laboratories, Natick, MA 01760)
Applied Microbiology 23, No. 4, 734-739 (Apr. 1972)

In a research study involving inoculated food packs and designed to determine the minimal radiation dose for foods, the authors needed a minimum of 100 ml. of spore suspension containing 10^8 spores/ml. of each of 10 strains of C. botulinum. Because the preparation and harvesting of these 10 strains of C. botulinum spores required a minimum of 6 weeks, the authors sought a more rapid, convenient, and economical technique for producing them, without reducing their radiation resistance and capacity to produce toxin in growth cultures. The biphasic procedure (involving a solid medium overlaid with an aqueous phase) had been examined by earlier workers and it seemed to offer some advantages over the conventional (deep broth culture) technique. In the present study, the authors examined the effect of several aqueous phases (in the biphasic method) on sporogenesis, and compared the radiation resistance and toxin-forming capability of cultures derived from spores of three type A strains and three type B strains of C. botulinum produced by the biphasic and the conventional procedures.

In the conventional method for spore production, Trypticase peptone broth was used. In the biphasic method, BBL Trypticase peptone, with added yeast extract and agar, was used. The three liquid phases used in the biphasic method contained thiamine-hydrochloride, yeast extract, or $(NH_4)_2SO_4$.

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0.5

to temperature of 18° ±1° C., the salt appeared to be protective to the cells. Within the range of from 3% to 12% tested, the optimum level of NaCl was strain dependent. When the test samples were held at 5° ±1° C., -5° ±1° C., or -18° ±1° C., the number of viable organisms per milliliter decreased regardless of the salt concentration. However, in the presence of added NaCl (in TSB), viable cells of the organism, in numbers up to 580 per ml., were detected at the end of the 30-day storage period.

Results for cells suspended in fish homogenate were similar to those for cells suspended in TSB, except that the fish homogenate was protective to the cells as compared to the TSB. This protection afforded by the fish homogenate was significantly lower than that provided by the NaCl at any of the levels tested. FTP

[2 figures, 3 tables, 10 references]

0.5 (2.05)

Sporogenesis of the various strains of C. botulinum was more rapid, convenient, and economical by the biphasic method than by the conventional method; furthermore, the biphasic method yielded as many or more heat resistant (80° C, for 10 min.) spores per milliliter as did the conventional one. Of the three liquid phases tested, the highest spore colony counts were obtained with the liquid phase of 2.0% $(NH_4)_2SO_4$. Maximum numbers of spores for all six strains formed after 5 to 6 days of incubation. Spores produced by the biphasic and conventional methods had essentially equal radiation resistances and their subcultures gave similar toxin titers.

[6 tables, 7 references]

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0.5 (2.05)

may be expected to vary. For example, hake and redfish are caught in deeper waters where high concentrations of C. botulinum were found; haddock and cod are caught in shallower bank areas where the organism was not detected. FTP

[2 figures, 14 references]

0.6 FUNCTIONAL PROPERTIES OF PROTEINS FOR FOOD SWELLING

0.5 (2.05)

The sodium chloride tolerance and pH sensitivity of the organisms were determined at 30° C. using beef infusion broth medium. The inoculum level was 2 x 10^6 spores (unheated) per replicate. Growth of the marine and terrestrial strains of C. botulinum type C was inhibited at salt levels from 2.5% to 3.0%. The terrestrial strains were more pH sensitive than were the marine strains; the terrestrial strains did not grow at pH below 5.62, three of the marine strains grew at pH 5.10 but not at pH 4.96, during extended incubation, and one marine strain grew at pH 5.25 but not at a lower pH level.

High levels of botulinum toxin were produced when the organisms were grown in fortified egg meat medium and protose peptone-tryptcase-yeast extract-glucose medium. Toxin produced by the marine and the terrestrial strains of C. botulinum type C showed no increase in toxicity after incubation with trypsin. FTP

[5 tables, 21 references]

0.5 (4.5) INFLUENCE OF HERRING MICRO-ORGANISMS ON FAT OXIDATION. I. DECOMPOSITION OF LINOLEIC ACID HYDROPEROXIDES

Grosch, W., F. Senser, and K. Fischer

Z. Lebensmitteluntersch. u.-Forsch. 147, No. 3, 140-144 (1971) (In German, English summary)

BEMIRA Abstracts 25, No. 2, Abstract No. 493, 103 (Feb. 1972)

The effect of 11 micro-organisms isolated from herring on linoleic acid hydroperoxides was investigated. The activity of the micro-organisms was divided into two groups, fast and slow breakdown of the hydroperoxides. C.S.B. Reprinted

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0.5 (6.54) MEETING OF THE FAO AD HOC WORKING GROUP ON SINGLE CELL PROTEIN

Anonymous

FAO Bull. [FAO/WHO/UNICEF; United Nations; New York, N.Y.], 2, No. 1, 2-5 (1971)

BEMIRA Abstracts 25, No. 5, Abstract No. 1678, 340 (May 1972)

An account of a meeting held during June 1971 at the Institute of Nutrition in Moscow. The problems presented by the adverse effects of nucleic acids ingested in large quantity were briefly discussed together with the nutritional value and potential food uses of single cell protein. A list of substrates suitable for single cell protein production is given. L.P.

Reprinted

0.5 STUDIES ON THE ANTIMICROBIAL SUBSTANCES OF SPONGES. VI. STRUCTURES OF TWO ANTIBACTERIAL SUBSTANCES ISOLATED FROM THE MARINE SPONGE DYSIDEA HERBACEA

Sharma, G. M., and B. Vig (Lamont-Doherty Geological Observatory of Columbia University, Palisades, NY 10964)

Tetrahedron Letters No. 17, 1715-1718 (1972) (Pergamon Press: New York, London)

Two antibacterial substances, designated A and B, were isolated from the sponge D. herbacea obtained from the western Caroline Islands. Substance A has the molecular composition of $C_{12}H_5O_2Br_5$. It is a pentabromo derivative of 2-hydroxy-diphenyl ether. Substance B has the molecular composition $C_{12}H_6O_2Br_2$. It is a dibromo derivative of 2-hydroxy-diphenyl ether. This paper describes the procedures involved in the isolation and the determination of the structure of the two antibacterial substances.

[8 references]

FTP

0.7 (9.13) SULFATE METABOLISM AND TAURINE SYNTHESIS IN THE CHICK

Martin, William G. (Division of Animal and Veterinary Sciences, West Virginia University, Morgantown, WV 26506)
Poultry Science 51, No. 2, 608-612 (Mar. 1972)

The relation of sulfate in the diet of chicks, taurine synthesis, and increased growth response was investigated. Day-old chicks were fed a purified-type diet supplemented with various levels of methionine and sulfate for 12 days. On the 13th day radioactive sulfate ($^{35}SO_4$) was orally administered to the chicks. On the 14th day they were killed and the livers were removed for taurine assay. In another experiment various levels of methionine, sulfate, and taurine supplemented the diet. After 14 days, growth response increased significantly when the diet was supplemented with sulfate and methionine.

The in vitro synthesis of taurine-^{35}S in liver from chicks fed the various level diets was measured. The total taurine in the liver increased, paralleling the methionine and sulfate induced-growth response. Further analysis showed that a portion of the sulfate was used in the synthesis of phosphoadenosinephosphosulfate ($PAP^{35}S$) which is required for the synthesis of taurine by this pathway. Methionine was shown to enhance the synthesis of taurine in the liver, and sulfate was shown to enhance the in vitro synthesis of $PAP^{35}S$. The author suggests that a part of the growth response caused by addition of sulfate to the diet is due to the reaction in which it is used in the synthesis of taurine. SW

0.7 SYMPOSIUM ON THE CHEMICAL ASPECTS OF NUTRITION NEEDS

[Authors and titles listed below]
Journal of Agricultural and Food Chemistry 20, No. 3, 455-537 (May-June 1972)
Card A

The various reports in this Symposium deal with new developments in the structure or metabolic function of vitamin and amino-acid nutrients, or to their deficiency states in man; the domestic and foreign problems in human nutrition; and the medical vs agricultural aspects of current nutritional problems. The papers are as follows:

"Introduction," by Myron Brin (Hoffmann-La Roche, Inc., Nutley, NJ 07110), p. 455.

"Carotenoid Vitamin A Precursors and Analogs in Foods and Feeds," by J. C. Bauernfeind (Chemical Research Department, Hoffmann-La Roche, Inc., Nutley, NJ 07110), pp. 456-473. [5 figures, 5 tables, 243 references]

"Mechanism of Action of Vitamin A in Differentiation of Mucus-Secreting Epithelia," by Luigi De Luca and George Wolf (Dept. of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139), pp. 474-476. [1 table, 19 references]

"Vitamin E. Regulation of the Biosynthesis of Porphyrins and Heme," by Padmanabhan P. Nair, Hari S. Murty, Priscilla I. Caasi, Sherry K. Brooks, and Jeffrey Quartner (Biochemistry Research Division, Dept. of Medicine, Sinai Hospital of Baltimore, Inc., Baltimore, MD 21215), pp. 476-480. [7 figures, 8 tables, 13 references]

"Vitamin E. The Biological and Environmental Antioxidant," by Daniel B. Menzel (Duke University Medical Center, Durham, NC 27706), Jeffery N. Roehm, and Si Duk Lee, pp. 481-486. [6 figures, 5 tables, 32 references]

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0.7 SYMPOSIUM ON THE CHEMICAL ASPECTS OF NUTRITION NEEDS

[Authors and titles listed below]
Journal of Agricultural and Food Chemistry 20, No. 3, 455-537 (May-June 1972)
Card B

the use of the Probyte in terms of human requirements is described, including the corrections for biological value, corrections for losses in processing, and methods for setting a single protein standard in crop genetics research and pricing of commodities. The Probyte has as its only dimension a calorie of essential amino acids; therefore, it can be applied in systems analysis, pricing policies, nutrition economics, and design of least-cost diets. Some examples of its use in systems models are given. [3 figures, 9 tables, 30 references]

"Chemical Aspects of Updating Diet Quality," by W. H. Sebrell, Jr. (College of Physicians and Surgeons, Columbia University, New York, NY 10032), pp. 518-522.

The use of chemicals for the nutritional improvement of foods began with the addition of iodides to salt to help prevent goiter and of vitamin D to prevent rickets. Now, several hundred chemicals have been approved to improve the color, flavor, texture, keeping quality, and nutritional value of foods. The enrichment of flour, bread, and other cereals is an outstanding example of the successful, economic use of chemicals to improve the nutritive value of foods.

The author believes that we should do everything possible to make our food supply nutritionally adequate at the lowest possible cost. To do this we must use safe and effective synthetic nutrients of all kinds.

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0.7 SYMPOSIUM ON THE CHEMICAL ASPECTS OF NUTRITION NEEDS

[Authors and titles listed below]
Journal of Agricultural and Food Chemistry 20, No. 3, 455-537 (May-June 1972)
Card C

Data are reported from a field study in which kindergarten children were provided either breakfast and lunch (BL Groups) or specific nutrients in a fruit-flavored drink (NC Groups). The breakfast included milk nearly every day, dry cereal, grits, meat, or cheese-toast several times a week. The lunch was a "type A" lunch which contained at least one-third of a Recommended Daily Allowance of vitamins, minerals, proteins, and calories per school week. The specific nutrients used for supplementation (NC Groups) were those that were limited in the diet of children of the area (determined from previous studies). Various biochemical tests were conducted to observe the changes in the nutritional status of the groups. Appropriate control groups were included.

In the group fed breakfast and lunch, a change in the distribution of biochemical values occurred and a larger percentage of the children moved into the acceptable ranges for hemoglobin, hematocrits, and serum iron at the conclusion of the experiment. The BL group showed significant improvements over its control group for the distribution of serum folacin, serum iron, and transferrin saturation. All groups, including the controls, showed an increase for vitamin A. The serum nonessential amino acid to essential amino-acid ratio in the BL and NC Groups increased without a concomitant change in either of the control groups. [7 tables, 5 references]

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0.7

"Protective Effect of Vitamin E on Plasma Lipid Dienes in Man," by Nicholas R. Di Luzio (Dept. of Physiology, Tulane University School of Medicine, New Orleans, LA 70112), pp. 486-490. [5 figures, 2 tables, 25 references]

"Role of Thiamine Triphosphate in Subacute Necrotizing Encephalomyelopathy," by Jack R. Cooper and Jonathan H. Pincus (Yale University School of Medicine, New Haven, CT 06510), pp. 490-493. [1 figure, 4 tables, 20 references]

"Interconversions of Vitamin B_6 in Mammalian Tissue," by Ernest E. McCoy and Carlo Colombini (University of Alberta School of Medicine, Edmonton, Alberta, Canada), pp. 494-498. [7 figures, 1 table, 22 references]

"Normal and Pathological Conditions Which May Alter the Human Requirement for Vitamin B_6," by R. R. Brown (University of Wisconsin Medical School, Madison, WI 53706), pp. 498-505. [14 figures, 1 table, 63 references]

"Nitrogen Balance and Plasma Aminogram in Measuring Supplemental Effect of Amino Acids for Children," by George G. Graham, Juan M. Baertl, and Robert P. Placko (Baltimore City Hospitals and School of Medicine, Johns Hopkins University, Baltimore, MD.), pp. 506-508. [3 figures, 3 tables, 13 references]

"The Probyte: A New Protein Unit System," by Harold L. Rice and Andrew H. Pettifor (Dept. of Industrial Engineering, Stanford University, Stanford, CA 94305), pp. 509-518.

The authors propose and describe the use of a new fundamental unit for protein. This unit, called a Probyte, is defined as one calorie composed of the eight essential amino acids required by the adult human in the gram-pattern of the protein of whole egg. A second term, the Probit, is proposed to account for the essential amino acids left over as fractional Probytes. The mathematical procedure for deriving the Probyte content of foods and of diets is described. In addition,

[Continued on Card B]

0.7

"Foods of the Future," by Aaron M. Altschul (Office of Nutrition, Agency for International Development, Washington, DC 20523), and Irwin Hornstein (Office of the Secretary, U.S. Department of Agriculture, Washington, DC 20250), pp. 532-537.

Future foods will be handled better, will be cleaner, and will have better quality and flavor than at present. Greater flexibility in choice of raw materials (including flavors and protein sources) will be available. Selection of food ingredients on a day-to-day basis will be made by computer, producing least cost standard products of high nutritional value and palatability. Foods will be engineered to be nutritionally complete and use of convenience foods will increase.

FTP

[15 references]

0.7 EVALUATION OF MEALS COOKED BY LARGE-SCALE METHODS: A COMPARISON OF CHEMICAL ANALYSIS AND CALCULATION FROM FOOD TABLES

Stock, A., L., and E. F. Wheeler
Br. J. Nutr. 27, No. 2, 439-448 (1972)
BFMIRA Abstracts 25, No. 6, Abstract No. 2045, 414 (June 1972)

The energy value, fat, protein and iron content of meals and complete day's diets prepared by large-scale catering methods for "Meals on Wheels," a convalescent home, a Nurses' home and the galley of a seagoing merchant ship were measured analytically. The results obtained were compared with values calculated and analytical values especially for fat and iron and for certain foods that are generally prepared in a non-standard way (e.g. fried eggs). L.P. Reprinted food composition tables. Wide differences were found between calculated and ana-

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0.7 EFFECT OF COOKING ON SELENIUM CONTENT OF FOODS

Higgs, Darla J., Virginia C. Morris, and Orville A. Levander (Human Nutrition Research Division, ARS, U.S. Department of Agriculture, Beltsville, MD 20705)
Journal of Agricultural and Food Chemistry 20, No. 3, 678-680 (May-June 1972)

Although selenium shows toxic properties, it does, also, have beneficial nutritional value when present in the diet in trace amounts. Because there is no published information on the effect of cooking foods on their selenium content, the study examined the influence of various cooking and heating treatments on the selenium content of some of the foodstuffs of the American diet. The heat treatments and foodstuffs involved included the drying of breakfast cereals, the boiling of cereals and grainproducts, the frying of eggs, the boiling of mushrooms and asparagus, the baking of chicken meat and flounder fillets, and the broiling of lamb chops, pork chops, and T-bone steak.

There was little or no loss of selenium as a result of boiling of cereals, frying of eggs, baking of flounder, and broiling of meats. Dry heating of certain breakfast cereals (the cereals were dried overnight at 100° C. in an electric oven) resulted in a 7 to 23% loss of selenium in the foodstuffs. Asparagus and mushrooms, boiled 20 min. in distilled water, lost 29% and 44% selenium, respectively. It was concluded that the major sources of selenium in the American diet (cereal products, eggs, seafoods, and meat) do not lose appreciable amounts of selenium when cooked by the ordinary methods.

FTP

[5 tables, 20 references]

0.7

"Nutrification: A Concept for Assuring Nutritional Quality by Primary Intervention in Feeding Systems," by Paul A. Lachance (Dept. of Food Science, Rutgers University, New Brunswick, NJ 08903), pp. 522-525.

The assurance of adequate nutrition on the basis of a balanced intake of commodity foods is impractical. This is so because an increasing share of the American diet is derived from prepared convenience foods of varying nutritional value. Such foods may have already undergone restoration, enrichment, fortification, or all three. Man's food tastes, food fashions, and dietary habits can not be relied upon as a sound guide to nutrition. Nutrification of selected foods (that is, to make them completely nutritious) would help foster good nutrition community wide.

Foods intended for meal replacements and foods which provide 7% or more calories as utilizable protein should be considered for proportionate nutrification with the NAS/NRC Recommended Dietary Allowance nutrients. The author recommends nutrification on the basis of protein rather than calories because (1) biochemically, micronutrients are related to protein metabolism or the formation of protein tissues, (2) the caloric consumption of protein is more constant than the total caloric consumption, and (3) the percent of each Recommended Dietary Allowance nutrient in a typical planned menu more closely approximates the percent protein than it does percent calories.

[1 figure, 1 table, 20 references]

"Use of Specific Micronutrients Intervention for Treatment of Malnutrition," by Jack L. Smith and Walter G. Unglaub (School of Medicine, Tulane University, New Orleans, LA 70112), pp. 526-531.

[Continued on Card C]

0.7 THE STATUS OF NUTRITION IN THE UNITED STATES
(0.4)

Babcock, M. J. (Department of Food Science, Rutgers University, New Brunswick, NJ 08903)
Food Product Development 6, No. 4, 56, 58, 60, 62, 64, 67, 86 (June-July 1972)

In determining the nutritional status of individuals three types of data are useful: food consumption studies, chemical analysis of bodyfluids, and physical examinations. All three are expensive to obtain, incomplete, and subject to error in interpretation.

The U.S. Department of Agriculture made a nationwide food consumption survey in 1955 covering 6,000 households. Another survey in 1965 covered 15,000 households. The nutrients calculated from the household diets were compared with the table of Recommended Dietary Allowances (RDA). The RDA classifies diets as "good," "fair," and "poor." In comparing data from the 1955 survey with that of 1965, the proportion of good diets decreased from 60% to 50%. Poor diets increased from 15 to 21%. The incidence of poor diets was similar for rural and urban populations.

Income was related to quality of diet. However, more than one-third of households with incomes above $10,000 had diets that failed to meet the RDA for one or more nutrients. Of households with incomes below $3,000, 37% had diets that satisfied the RDA.

Protein intake increased slightly from 1955 to 1965 because of increased meat consumption. Calcium dropped due to lower consumption of milk: only 70% of the diets met the RDA in 1965. Iron intake was good in 1965. Three nutrients--calcium, vitamin A and C--were examined in more detail. Calcium was low in the

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1.126 POPULATION STUDY OF YELLOWFIN TUNA IN THE WATERS
(9.125) ADJACENT TO TAIWAN
(1.0152)

Yang, Rong-Tszong (Institute of Oceanography, National Taiwan University, Taipei, Taiwan, Republic of China)
Acta Oceanographica Taiwanica No. 1, 137-155 (Dec. 1971)

The yellowfin tuna fishery, one of the most important of Taiwan, is divided into a deep-sea and an inshore fishery. The deep-sea fishery uses longline boats of 50 to 3,400 tons operating as far out as the southwest Pacific, the Indian Ocean, and the Atlantic Ocean. The inshore fishery operates in the waters adjacent to Taiwan, extending from the Bashi Channel through the Sulu, Celebes, and Banda Seas with longline boats below 50 tons. The base port of the fishery is Kaohsiung.

Previous reports have indicated variability in the morphometrical features of yellowfin samples taken from the northwest Pacific and from yellowfin samples taken from the equatorial Pacific. Other data indicated that the length-weight relationship of yellowfins in the waters southwest of Taiwan is different from those in the eastern equatorial Pacific, and the scale size is different from that of western Pacific and Atlantic specimens. Because the yellowfin fishery is important, studies were made to ascertain whether or not the yellowfin caught by the inshore longline boats is distinct from yellowfin of the western Pacific. The study was based on morphometric measurements using covariance analysis, generalized distance function analysis, and catch statistics. The morphometrical characteristics used were head length and size of scale from the body portion just below the sixth dorsal finlet counted from the tail. Specimens were

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0.7 THE STATUS OF NUTRITION IN THE UNITED STATES
(0.4)

Babcock, M. J. (Department of Food Science, Rutgers University, New Brunswick, NJ 08903)
Food Product Development 6, No. 4, 56, 58, 60, 62, 64, 67, 86 (June-July 1972)

Card B

Riboflavin in casual urine samples was twice as low in children under 17 as in adults, and low levels were twice as common for negroes as for other ethnic groups.

Low heights and weights among children tested were twice as prevalent as in normal children in Iowa. More children below poverty line had retarded growth than children above the poverty line.

The author concludes that there is no formula for calculating nutritional status. He suggests that there is a national nutritional problem which can be solved only by coordinated efforts of farmers, the food industry, consumers, educators, and the government. [8 figures, 3 tables, 9 references] SW

2.05 INTERRELATIONSHIP OF HEAT AND RELATIVE HUMIDITY
(0.5) IN THE DESTRUCTION OF CLOSTRIDIUM BOTULINUM TYPE E SPORES
ON WHITEFISH CHUBS

Pace, Paul J., Edward R. Krumbiegel, and Henry J. Wisniewski (Milwaukee Health Department, Milwaukee, WI 53202)
Applied Microbiology 23, No. 4, 750-757 (Apr. 1972)

Earlier work showed that whitefish chubs, commercially smoked at 82.2° C. (180° F.) for 30 min., contained (in about 1% of the fish samples) C. botulinum type E spores. Inasmuch as the organism, reportedly, has a low tolerance to heat, the reason for this unexpected result was not apparent. However, other workers found that smoked whitefish chubs commercially heat-processed in an atmosphere of 100% relative humidity showed no C. botulinum type E spores. W. G. Murrell and W. J. Scott [J. Gen. Microbiol. 43, 411-425 (1966)] found that spores of C. botulinum type E were most resistant to heat at a_w (water activity) of from 0.2 to 0.4. The present authors surmised that the persistence of spores of C. botulinum in smoked whitefish chubs may be related to the relative humidity of the atmosphere in which they are heat smoked. The study examined the relationship between temperature, time, and relative humidity in the destruction of spores of C. botulinum during heat processing and smoking of whitefish chubs.

An electronically controlled environmatic test chamber was used that exposed the fish to the desired temperatures and relative humidities; test conditions were set up to simulate those used in commercial whitefish smoking plants. Spores of C. botulinum type E were inoculated into the loin muscle of the fish or were introduced on the surface of the fish. The timing of the exposure of the fish started

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1.70 (9.125)

ACCUMULATION AND FUNCTION OF LIVER OIL IN FLORIDA SHARKS

Baldridge, H. David, Jr. (Mote Marine Laboratory, 9501 Blind Pass Road, Sarasota, FL 33581)

Copeia, No. 2, 306-325 (June 8, 1972)

Maneuverability required by predatory sharks in capturing agile prey depends on the relation between submerged body weight and area of lifting surfaces--the pectoral fins. Density of the shark's body fluctuates with its content of water and liver oil, and water accounts for about 80% of white muscle tissue weight. At such high values, a slight variation in water percentage is indicative of either uptake or loss of a substantial weight of water in a large shark. Liver oil varies from an almost negligible fraction of total weight in some juveniles up to about 25% of the weight of certain adults. In addition, liver oil in sea water provides about five to six times the buoyancy of an equal weight of solute free water. Based on analysis of data on body weight, liver weight, and area of pectoral fins the author concludes that buoyancy control holds priority over lipid reserve as a function of liver oil in large sharks. Primarily as a result of buoyancy provided by liver, the loading of hydrodynamic lifting surfaces in mature sharks is maintained within narrow limits. Deterioration of hydrostatic and/or hydrodynamic equilibrium would be expected to adversely affect a shark's ability to capture food and might be a factor in leading the animal to seek out relatively helpless prey such as swimmers at beaches and victims of disasters at sea.

The author suggests, as possible antishark measures, devices to upset the hydrostatic balance of a shark such as chemicals in bait which would generate large volumes of gas by reacting with digestive fluids, or a weapon designed to inject pressurized gas directly into the body.

[7 figures, 2 tables, 24 references] SW

2.05 (0.5)

when the desired interval temperature was reached in each fish in the experiment.

When the inoculated whitefish chubs contained low numbers of spores of C. botulinum type E, the spores were destroyed within 30 min. on the fish held at an internal temperature of 82° C. (179.6° F.) in an atmosphere of at least 70% relative humidity. When the inoculated whitefish chubs contained high numbers (several hundred thousand) of spores of the organism, the spores were destroyed regularly within 30 min. at an internal temperature of 82° C. and at a minimum relative humidity of 70%. When the whitefish chubs were heated in an atmosphere of 70% relative humidity, the spores were reduced by 2 to 4 logarithms at 77° C. (170.6° F.), by 5 to 6 logarithms at 82° C. (179.6° F.), and by more than 6 logarithms at 88° C. (190.4° F.). In a separate test with spores of C. botulinum type B, a 5 to 6 logarithm reduction of spores was obtained when the inoculated whitefish chubs were processed at 82° C. (179.6° F.) in an atmosphere of 70% relative humidity. The results demonstrated that the effectiveness of heat in destroying spores of C. botulinum type B and type E depends directly on the relative humidity of the atmosphere in which the fish are processed.

[3 figures, 5 tables, 19 references] FTP

0.8 FERROMAGNETIC METAL DETECTOR

Loma Engineering Ltd. (D. W. Pascoe and G. Mayo) (pat.)
British Patent 1,270,821
BFMIRA Abstracts 25, No. 6, Abstract No. 2316, 468 (June 1972)

This invention can be used to detect iron or steel foreign bodies in foodstuffs which are shielded by a non-ferric metal container, e.g. aluminium foil.

Reprinted

0.7 (0.4)

diets of rural families (32%) and slightly higher in urban families (25%). Vitamin A was deficient in 76% of rural diets and 70% in urban diets. Vitamin C was deficient in 75% of rural diets and 60% in urban diets.

Food consumption (for a 24-hr. period) of 14,500 individuals of all ages was studied in 1965. Children under 2 and all females over 8 years of age were deficient in iron. The latter were also deficient in calcium, thiamine, and riboflavin. Men 55 and older were deficient in calcium. The U.S. Department of Health Education and Welfare surveyed (in 1968-1970) nutrition of low income families (nonfarm poverty line = $3,355 per year) in 10 states and New York City. The study included 83,000 persons in 23,000 households and was based on food consumption data, clinical examinations of one-half the sample, and urine analysis of one-fourth of the sample. The dietary standard was similar to RDA. Data for five states has currently been released. About 39% of persons above and 32% below the poverty line met the dietary standard. Infants, adolescents, and aged people below the poverty line were vulnerable. Diets of infants and adolescents (10-16 years of age) were low in iron and vitamin C. The diet of 25% of people 60 and older contained less than half the required calories and was low in vitamins A and C. Blood hemoglobin was deficient in 5% and low in 25% of people below the poverty line, and low in 10% above poverty line. Of all children examined 8% were deficient in hemoblogin. One-third of all negroes were low or deficient and 6% were deficient in hemoglobin. Plasma vitamin A was deficient in only 9% of persons tested, but rose to 15% in children under 10 and in American Indians. Only 6% of the people were low in vitamin C.

[Continued on Card B]

1.126 (9.125)(1.0152)

collected from waters adjacent to Taiwan, equatorial Pacific, and the Indian Ocean. Measurements and collection of scales were made on specimens drawn from fish landed at the fish markets of Kaohsiung and Tungkang from April through November 1970. Only specimens with a fork length of 1,000 to 1,400 mm. were selected for comparison.

The data collected in the study indicated that yellowfin taken in the waters adjacent to Taiwan are significantly different from those taken in the Indian Ocean. The differences in morphometric data on yellowfin taken from the waters adjacent to Taiwan and those taken from the equatorial Pacific are so small that the determinations whether or not they form a single population could not be made. In addition, examination of the hooking rates along with morphometric data indicates that there is a group distributed in the waters around the Philippines and the Sulu and Celebes Seas distinct from a group in the waters around New Guinea and the Solomon Islands.

[8 figures, 8 tables, 25 references] SW

2.3 FISH HANDLING METHOD AND APPARATUS

Szymanski, Chester, and Albert J. Ballentine (San Jose, Calif.); assignors to FMC Corporation of Delaware (pat.)
U.S. Patent 3,561,041 (Feb. 9, 1971)

This apparatus is designed to deliver fish headfirst in a single file to cutting or other processing operations. It may be used for small fish (herring, pilchards, anchovies) or for large fish (menhaden, cod, salmon). FTP

2.115 BOSTON SEA DART

Anonymous
Fishing News No. 3075, 6-7, 12 (June 2, 1972)

The new 118-foot stern trawler, Boston Sea Dart, owned by a Lowestoft fishing firm is an advanced design for near water trawlers.

The fishing industry recognized that for boats over 130 ft. stern trawler layout has advantages over the conventional trawler in terms of safety and easier working methods. A suitable design for boats between 100 and 130 ft. in length has been in question. The Boston Sea Dart was designed to be a medium-size stern trawler so that the factors of safety and less manual labor would be incorporated. The basic design was developed by the White Fish Authority Industrial Development Unit. The ship has a single screw, an overall length of 117 ft. 9 in., an LBP of 101 ft., a beam of 26 ft. 10 in., a molded depth of 15 ft., a gross tonnage of 311.76, and a net tonnage of 108.50. She has a round bilge form with a block coefficient of 0.50, a raked soft nose bow, and a transom stern incorporating a small stern ramp. A fixed Kort nozzle is fitted. Below deck the vessel is subdivided into forepeak, engineroom, fishroom, fish handling room, and steering gear compartment. There is a deep double bottom below the fishroom and fish handling room, and the fresh-water tank is below the forward end of the engineroom. The superstructure containing bridge and crew's quarters extends from midships forward, and the trawl deck extends from midships aft.

The main engine is a four stroke, in line, six-cylinder diesel with a continuous rating of 1095 b.hp. at 750 r.p.m. Housed in a 6 ft. 6 in. diameter fixed nozzle is the three-bladed, bronze, controllable pitch propeller. It is driven

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3.2341 LIQUID NITROGEN FREEZING COUNTERS RISING LABOR, RAW MATERIAL COSTS

Kivert, A. N., and J. T. Sills (Air Products and Chemicals Inc., Allentown, Pa.)
Quick Frozen Foods 34, No. 11, 55-57, 84 (June 1972)

Liquid nitrogen freezing systems are being used commercially to freeze certain meat and poultry products. In the basic countercurrent heat exchange setup, the food passes through successively colder nitrogen gas recirculation zones, a liquid nitrogen vaporization zone, and air equilibrium zone. Production rates range from about 300 to 4,000 pounds of food product per hour. Modern liquid nitrogen freezing systems are almost completely automatic.

The advantages of liquid nitrogen freezing systems are as follows: (1) The initial investment is comparatively small; (2) the labor required for operating the system is small; (3) the maintenance requirements are low; and (4) the weight loss of product during the freezing process is relatively small.
[1 illustration]

FTP

2.12 (1.125) DISTRIBUTION OF FORAGE OF SKIPJACK TUNA (EUTHYNNUS PELAMIS) IN THE EASTERN TROPICAL PACIFIC

Blackburn, Maurice (Institute of Marine Resources, Scripps Institution of Oceanography, University of California at San Diego, P.O. Box 109, La Jolla, CA92037), and R. Michael Laurs (National Marine Fisheries Service, Fishery-Oceanography Center, P.O. Box 271, La Jolla, CA 92037)
NOAA Technical Report NMFS SSRF-649, 16 pp. (Jan. 1972). For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 0320-0036, Price $0.30.

Most of the fishery for skipjack tuna (E. pelamis) in the eastern tropical Pacific lies within a few hundred miles of the American coast. Skipjack taken in these waters are probably adolescents of a migratory population which breeds in the central Pacific and is not being fully exploited.

The U.S. tuna fishery in the eastern Pacific may become increasingly dependent upon skipjack because the tuna fleet is growing and the fishery for yellowfin (Thunnus albacares) is regulated. Other than skipjack there is no equally available and commercially marketable species. The fishery has not been able to yield more than 265 million pounds (120,200 metric tons) from the coastal areas in any one year since 1966 and the yearly catch has been as low as 127 million pounds (57,600 metric tons). Thus, new fishing grounds are needed and could become available if offshore areas of skipjack abundance were known. Because of proximity to the spawning grounds some of these offshore areas may yield larger fish than are taken near the coast. Larger fish are better suited to canning.

The U.S. tuna fleet would benefit from information on unfished offshore regions of the eastern tropical Pacific abundant with skipjack. The cooperative

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2.8 (9.19) EFFECTS OF DRESSING AND COOKING ON DDT CONCENTRATIONS IN CERTAIN FISH FROM LAKE MICHIGAN

Reinert, Robert E., Donald Stewart, and Harry L. Seagran (U.S. Fish and Wildlife Service, Great Lakes Fishery Laboratory, Ann Arbor, MI 48107)
Journal of the Fisheries Research Board of Canada 29, No. 5, 525-529 (May 1972)

The purpose of this study was to obtain information on the distribution of DDT residues in certain fish from Lake Michigan and to determine the effects of different methods of processing and cooking on the DDT levels in these fish. This paper reports specifically on (1) the effects of dressing on the DDT residue content--the concentration of DDT was measured in different parts of the body of yellow perch (Perca flavescens), bloaters (Coregonus hoyi), lake trout (Salvelinus namaycush), and coho salmon (Oncorhynchus kisutch), (2) the effects of brining and smoking on concentrations of DDT residues in bloaters, and (3) the effects of frying, baking, and broiling on the concentrations of DDT residues in bloaters and yellow perch.

The levels of DDT residues were highest in the parts of the body of the fishes with the highest oil contents. Dressing of the yellow perch (removing viscera and heads) reduced the DDT residues and oil content (as compared to the whole fish) by more than 90%, but dressing had little effect on the relative oil content (between the dressed and whole fish) of the other three species. The level of DDT residues in the bloaters was effected little by the smoking process but was reduced by the other methods of cooking--from 8.0 p.p.m. in the raw fish to 2 p.p.m. after frying the fish in corn oil; from 10.7 p.p.m. to 3.9 p.p.m. after frying the fish in lard; and from 9.1 p.p.m. to 3.2 p.p.m. after broiling the fish. The level of DDT residues in the fillets of yellow perch went from 0.3 p.p.m. (raw) to 0.4 or 0.5 p.p.m.

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2.12 (1.125)

EASTROPAC Oceanographic Expedition of 1967-1968, coordinated by the National Marine Fisheries Service, extracted such information from collected data. The expedition found that skipjack group where food is abundant in waters ranging in temperature from 20° to 29° C.

The prey of skipjack includes several active pelagic fishes, cephalopods, and crustaceans about 1 to 10 cm. in size. This collection of forage is called micronecton. The EASTROPAC cruises examined net-caught micronecton samples taken over a large area of the eastern tropical Pacific. In the region from long. 92° to 119° W. major areas of maximum concentration of potential skipjack forage remained essentially constant. Two of the areas lie parallel to the equatorial upwelling zone. Other areas of abundant forage occur generally between lat. 6° and 14° N., lat. 14° and 20° N., and long. 107° and 119° W. These concentrations of forage are comparable with the nearshore areas of the present skipjack fishery. The abundance of skipjack at the new offshore locations might therefore be sufficient to support commercial operations. This conclusion is reinforced by later reports of skipjack caught with little effort by trolling or live-bait fishing in the same locations. [7 figures, 3 tables, 30 references] SW

2.8 (9.19)

after baking, frying, or broiling the fish.

The parts of the fish that had the highest level of DDT residues also contained the highest concentrations of oil. Because the distribution of oil in the body parts of the fish varies among the species, a method of dressing and cleaning may reduce the comparative level of DDT residues in one species but not in another. In the yellow perch most of the oil is located in the offal, thus the fillets (edible portion) would contain a comparative lower level of DDT residues. This situation does not apply to bloaters, coho salmon, and lake trout, because the oil in these fishes is more evenly distributed throughout the body. Trimming off the fatty areas along the back (dorsal section), lateral line, and belly of fillets and steaks of coho salmon and lake trout would remove those areas containing the more concentrated amounts of DDT residues. Losses of DDT residues on cooking was generally proportional to the amount of oil (where the higher levels of DDT residues are located) lost.
[1 figure, 4 tables, 3 references] FTP

2.3 SHRIMP PROCESSING MACHINE AND METHOD

Jonsson, Gregor (Highland Park, IL 60035) (pat.)
U.S. Patent 3,566,437 (Mar. 2, 1972)

This shrimp processing machine has a shell separating station in which a spiked unit engages the meat and moves ahead at a slightly faster rate than does the shell of the shrimp. This action partially separates the meat from the shell. Then, the spikes back up as the shell continues ahead, thus the meat and shell are pulled apart. FTP

2.115

through a 2.5:1 reduction gear box with built-in propeller pitch control. The clutch and propeller pitch are controlled from the wheelhouse. An engine power takeoff drives the engineroom auxiliary equipment. Double bottom tanks, port and starboard, carry 77 tons of fuel. Another 6 tons are carried in wing tanks in the engineroom. Two funnels--port and starboard--take machinery exhausts in one and ventilation and other pipes in the other.

The Boston Sea Dart is designed to be operated safely and effectively with a 75% reduction in manual work. A relatively small crew is required.
[8 photographs] SW

2.3 SHRIMP DEHEADING MACHINE

Gruber, William J. (P.O. Box 904, Grand Isle, LA 70358) (pat.)
U.S. Patent 3,665,556 (May 30, 1972)

This apparatus separates the head portion from the edible body portions of whole shrimp. FTP

2.3 FISH BEHEADING AND CLEANING APPARATUS

Hogan, Elmer R., and John I. Simpson; assignors to Smith-Berger Mfg. Corp., Seattle, Wash.) (pat.)
U.S. Patent 3,670,363 (June 20, 1972)

This apparatus consists of three components; a fish-beheading mechanism, a fish-cleaning mechanism, and a mechanism for transferring the fish between the two operations. The apparatus is suited for beheading and cleaning fish of moderate size, particularly salmon. FTP

2.12 NORWAY FINDS ANOTHER MEAL FACTORY FISH
(1.5)

Anonymous
Fishing News International 11, No. 6, 13 (June 1972)

Blue whiting is one of the under-used species in the North Atlantic area. Large shoals of this fish have been found by the Norwegian research ship G. O. Sars about 100 miles off Iceland, east of the Faeroe Islands and at depths of 200 to 250 fathoms west of Ireland. The blue whiting is related to the cod and haddock. It is pelagic but does not concentrate on the surface in sufficient quantities to be accessible to purse seiners. Blue whiting reaches maturity at an age of 2 to 4 years and 20-cm. length. Spawning is pelagic but deep and, in the northeast Atlantic, beyond the continental shelf. Growth is rapid during the first 2 years; and in maturity the fish reaches a length of 40 cm.

Reports from British research groups indicated the blue whiting to be soft fleshed and of excellent flavor. The scales are easily rubbed off in the trawl with the result that the keeping quality is not good.

British fishermen have not been attracted to these fish stocks, but the slump in major winter and summer fisheries in Norway has aroused interest in this potential fishery. Two commercial trawlers were sent out from Norway to test fish the stocks of blue whiting. They took more fish than they could handle, their nets breaking under the strain of the heavy catches. Concentrations of fish were found in depths of about 200 fathoms.

The Norwegian fishmeal industry has been slow because of conservation measures taken to protect stocks of the better known fish. With the advent of the blue whiting stocks activity in the industry should pick up. SW

3.238 TESTING PACKAGING FILMS

Sacharow, Stanley (East Orange, N.J.)
Food Product Development 6, No. 4, 40-41, 43 (June-July 1972)

Packaging materials should be selected for the following characteristics: ability to withstand normal and severe handling and shipping; ability to feed through package assembly machinery rapidly without difficulty; compatible with product to prevent undesirable changes in the product induced by the packaging material or changes in the material induced by the product; impermeable to gas and vapor, and resistant to cracking or tearing.

Test procedures are available to identify materials and measure their properties and to evaluate the packaged product. These procedures are published by the American Society for Testing Materials (ASTM), Technical Association of the Pulp and Paper Industry (TAPPI), the Packaging Institute (PI), National Flexible Packaging Association (NFPA), and American Boxboard Association (ABA). In addition, spot test procedures used to identify packaging compounds are summarized by F. Feigl, Spot Tests in Organic Analysis (5th ed., 1956), Elsevier Press.

An example of the use of a spot test is in the identification of polyvinylidene chloride (PVDC) coatings. PVDC coatings are applied on plastic films to upgrade their inherent gas-moisture barrier. To detect a PVDC coating, a drop of morpholine is placed on the surface of the film. If PVDC is present a brown-black color will appear in the spot.

Plastic films may be identified by tests for solubility in various solvents and by exposure to flame to observe burning and odor characteristics. Films also exhibit specific absorbance when exposed to the infrared spectrum. An example of

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4.19 LIPIDS OF CRASSOSTREA VIRGINICA. 1. PRELIMINARY INVESTIGATIONS OF ALDEHYDE AND PHOSPHORUS CONTAINING LIPIDS IN OYSTER TISSUE

Sampugna, Joseph, Leslye Johnson, Kermit Bachman, and Mark Keeney (Department of Chemistry, University of Maryland, College Park, MD 20742)
Lipids 7, No. 5, 339-343 (May 1972)

Earlier work has dealt with gross composition of oyster tissue and a few studies on sterol components, glycolipids, and fatty acid composition. This paper reports data on the distribution of plasmalogens among the major fractions of oyster lipid, and the distribution of phosphorus among the polar lipids obtained from the tissue of the oyster. [A plasmalogen is a phosphatide that is a precursor of plasma in tissue. A phosphatide is a lipoid substance occurring in cellular structures and contains esters of phosphoric acid. Plasmal is a substance containing

Table 1

Lipid material	Weight %	Phosphorus µg./mg. of the lipid	Phosphorus % of total phosphorus	Aldehyde µmoles/mg. of the lipid	Aldehyde % of total aldehyde
Total lipid extract	2.4 (a)	10	--	0.139	--
Neutral lipid fraction	58 (b)	0.08	0.5	0.080	28.3
Glycolipid fraction	6 (b)	2.3	2.1	0.068	3.0
Polar lipid fraction	36 (b)	24	97.4	0.272	68.7

(a) Based on wet weight of oyster tissue.
(b) Based on lipid recovered after chromatography.

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3.30 THE MECHANISM OF MICROBIOLOGICAL LEAKER SPOILAGE OF CANNED FOODS: A REVIEW

Put, Henriette M. C., H. Van Doren, W. R. Warner, and J. Th. Kruiswijk (Carle C. Conway Laboratory, Thomassen and Drijver-Verblifa N. V., Deventer, The Netherlands)
Journal of Applied Bacteriology 35, No. 1, 7-27 (Mar. 1972)

The preservation of foods by canning is based on two principles first defined by Nicolas Appert (1749-1841): (1) the food is conditioned in a container which is sealed and impenetrable to liquids, gases, and microorganisms; (2) the sealed container is subjected to heat or any other permissible treatment in such a manner as to destroy or inactivate enzymes, microorganisms and their toxins, the presence or propagation of which might cause the food to deteriorate or render it unfit for human consumption.

The canning operation may fail in two respects. First, if the sealed container is not subjected to sufficient heat the contents are not effectively sterilized and so spoil on storage. This type of spoilage is due to underprocessing. The second type of spoilage results when the contents of the can which were effectively sterilized are subsequently reinfected by microorganisms from the surrounding environment that gained access to the contents through leaks in the sealed container. This type of spoilage is called leaker spoilage. A study was made of leaker spoilage to determine the mechanism and other problems involved. Results of the study showed important factors that contribute to reinfection of canned foods. These factors are: (1) the mechanical construction of the can; (2) the diameter, profile, shape and length of the leakage path, and the capillary action

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4.19 (8.53) MOLLUSCAN STEROL: A REVIEW

Idler, D. R., and P. Wiseman (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)
Journal of the Fisheries Research Board of Canada 29, No. 4, 385-398 (Apr. 1972)

This review covers published work on identification of mollusc sterols, isolation of new marine sterols, biosynthesis, variation in sterol content, and hypocholesterolemic effects exhibited by certain sterols of bivalves. Also, data obtained before the advent of gas-liquid and thin-layer chromatography and mass spectrometry are discussed, where possible, in relation to studies made using modern techniques.

The small and primitive classes (and extremely rare) Monoplacophora and Scaphopoda (tooth shells or tusk shells) have not been investigated for sterols. Also, the wormlike molluscs from the subclass Aplacophora (class Amphineura) and the highly specialized pelecypods of the subclass Septibranchia have not been studied. The Polyplacophora (class Amphineura) contain Δ^7-cholestenol and sometimes in addition contain cholesterol and brassicasterol.

Chitons (class Amphineura) characteristically show a predominance of Δ^7-cholestenol and recent work indicates that certain species contain mixtures of Δ^7- and Δ^5-sterols. The Pelecypods (molluscs) show the most varied and complex sterols of all the molluscs. With few exceptions, cholesterol is the principal sterol in the molluscs, but as many as 13 sterols may be present in one species. Other major sterols of the Pelecypods are 24-methylenecholesterol, brassicasterol, and 22-dehydrocholesterol. Sterols of Gastropods are predominantly cholesterol and

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in this passageway and within the adjacent regions of the double seam; (3) the number of bacteria contained in the liquid around the cooled wet can and trapped in the outerpart of the double seam, the motility of the bacteria, their ability to multiply, and their multiplication rate; (4) the time during which the double seam is wetted by the contaminated liquid; (5) the viscosity of the contaminated liquid; (6) reversible and nonreversible deformations of the double seam by small repeated blows or hard single impacts of the can while it is wetted with contaminated liquid; (7) subatmospheric pressure inside the can after sterilization and cooling; and (8) sudden pressure fluctuations outside the can during sterilization and cooling.

To reduce the incidence of bacterial infection the following principles should be practiced: (1) ensure that seam construction of cans is made to accepted quality standards; (2) avoid rough handling of cans; (3) avoid excessive deformation of can ends during sterilization and cooling; (4) ensure that cooling water conforms to drinking water standards and that the residual level of free chlorine is 1-2 mg./l. of the water drained from the cans after cooling; (5) wash and disinfect at frequent intervals all surfaces contacting the double seam; (6) dry cans immediately after cooling and transport them on clean surfaces; (7) check cannery hygiene by microbiological surveys; and (8) require high hygienic standards of employees. [7 figures, 13 tables, 5 plates, 58 references] SW

3.238

these tests used in the identification of a polyester film are the following observations: it is very strong and transparent; burns slowly, melting into pearls, with a mildly sweet odor; insoluble in all organic solvents; infrared absorption peaks at 8.0 and 9.0 μm. Physical tests may be performed to determine gloss, haze, and clarity for appearance. Tests for static, slip, and blocking are used to determine how well the material can be manipulated by the forming machinery. Tests for impact fatigue and flex resistance give information on resistance of films to mechanical stress.

Accelerated aging is sometimes used to determine shelf life of a package in a short time by using abnormally high temperatures and extrapolating results. The author warns that only when experience demonstrates correlation between such tests and normal use conditions can extrapolations be used. SW

3.2382 MIGRATION OF PROCESSING AIDS FROM PLASTIC FILM INTO FOOD FATS (2.43)

Fiege, K. (Unilever Forschungsges. G.m.b.H., Hamburg, Germany)
Chemical Abstracts 76, No. 22, 127983x (May 29, 1972)

4.19 (8.53)

sometimes its precursor, desmosterol. Cephalopods probably contain cholesterol. Sterols recently identified in the sea scallop are 22-trans-24-norcholesta-5,22 dien-3β-ol, and 29-methylisofucosterol (neither of these compounds have been found elsewhere in nature).

There seems to be considerable variations in the sterol content of molluscs. Molluscs contain hypocholesterolemic sterols. Many pelecypods and herbivorous gastropods are able to synthesize sterols.
[2 figures, 3 tables, 77 references] FTP

3.30 THE DEGRADATION OF TRIMETHYLAMINE OXIDE TO METHYLAMINES AND FORMALDEHYDE IN CANNED SHRIMPS

Sundsvold, O. C. et al.
J. Ass. publ. Analysts 9, No. 3, 86-95 (1971)
BFMIRA Abstracts 25, No. 1, Abstract No. 74, 16 (Jan. 1972)

A series of five experiments was carried out which involved the subjection of methylamine oxide to very varied conditions, and the results indicated that it was a very stable compound which only underwent direct fission into formaldehyde and dimethylamine under drastic conditions favouring thermal decomposition. However its reduction product, trimethylamine, was less stable and underwent conversion to formaldehyde and methylamine. The results obtained confirm reports that the formation of formaldehyde in stored shrimp occurs through the agency of oxygen acceptors in the fish tissue which provide conditions necessary for the formation of trimethylamine and hence formaldehyde and methylamine. D.M.L. Reprinted

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4.19

one or more aldehydes of the type related to palmitic acid and stearic acid and obtained in the form of an acetal.]

The lipids were extracted from the homogenized oyster tissue with a methanol-chloroform mixture. Total lipid was separated into three fractions by chromatography on Biosil A. In the elution scheme chloroform was used to elute the neutral lipids; acetone was used to collect the glycolipid fraction; and methanol was used to elute the polar lipids. The lipid, phosphorus, and aldehyde content of total lipid extract and lipid fractions are shown in table 1. Table 2 shows the phosphorus distribution among the polar lipids of the oyster tissue.

Table 2

Class of phospholipid	Phosphorus content						% of each class of phosphonolipid
	Total		As phosphate		As phosphonate		
	A	B	C	D	E (1)	F (2)	
	μg.	% (3)	μg.	% (3)	μg.	% (3)	
Diacyl	122.7	40.7	114.8	38.1	8.0	2.6	6.5
Plasmalogen	85.0	28.2	65.6	21.8	19.4	6.4	22.8
Sphingolipid	61.6	20.4	20.8	6.9	40.8	13.5	66.2
Glyceryl ether	32.1	10.6	25.0	8.3	7.1	2.4	22.1

(1) (Values in E) = (values in A)-(values in C)
(2) (Values in F) = (values in B)-(values in D)
(3) Values are in % of total (phosphate plus phosphonate) phosphorus.

The fairly equal percentage values of phosphonolipid in the plasmalogen and glyceryl ether fractions in the oyster lipid (table 2) supports the theory that a product precursor relation exists between these two lipid classes.
[3 tables, 21 references] FTP

4.19 (8.53) LIPID COMPOSITION OF THE QUEEN CRAB (CHIONOECETES OPILIO)

Addison, R. F. (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada), R. G. Ackman, and J. Hingley (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, N.S.)
Journal of the Fisheries Research Board of Canada 29, No. 4, 407-411 (Apr. 1972)

The muscle tissue of the queen crab contained 0.75% lipid of which 78.8% was phospholipid (mainly choline phosphatides) and the rest mainly cholesterol; the viscera contained 13.6% lipid, mostly triglyceride. The distribution of the lipid classes in the lipid of the queen crab is shown in the accompanying table.

The lipids of the queen crab are generally similar to those of other marine species. The

Lipid class	Content of lipid class as % of the total lipid of queen crab:	
	Muscle	Viscera
Hydrocarbons	0.6	1.4
Sterol esters	0.4	
Triglycerides	7.3	91.3(a)
Free fatty acids	3.8	
Sterols	10.1	3.8
Cardiolipin	3.8	trace
Cephalins	22.1	1.1
Lecithins	49.1	2.4
Sphingomyelins	3.8	

(a) Also includes a small amount of diacyl glyceryl ethers.

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6.1 (6.19)(6.55) 1972 FEEDSTUFFS ANALYSIS TABLE

Hubbell, Charles H. (Arlington Heights, Ill.)
Feedstuffs 44, No. 26, 30-31 (June 26, 1972)

The table is a convenient summary of the latest information concerning the analysis of various feed ingredients. (It may be obtained from the Feedstuffs Reader Service Dept., P.O. Box 67, Minneapolis, MN 55440. Single copy--$0.50; 2 to 9 copies--$0.30 each; and 10 or more copies--$0.25 each.) The percentage of protein, fat, fiber, calcium, phosphorus, and ash of each ingredient is shown. The calories per pound of productive and metabolizable energy derived from each ingredient are listed for poultry. Also listed are total digestible nutrients percent for ruminants. Of the vitamins, riboflavin, niacin, pantothenic acid, and choline are shown in milligrams per pound. Arginine, lysine, methionine, cystine, tryptophan, and glycine are the amino acids listed in percentages.

The feed ingredients include: grains--whole and byproducts; oilseed meals; byproducts from citrus, baking, sugar refining, dairy and brewer's processing; meals from alfalfa, fish, shrimp, meat, and yeast.

An accompanying table contains the calcium and phosphorus content of several types of bone meal, various phosphates, gypsum, limestone, and oyster shell. The nutrient table has values for additional amino acids.
[4 tables]

SW

6.190 UNIDENTIFIED FACTORS IN TURKEY NUTRITION AFFECTING HATCHABILITY AND PROGENY GROWTH

Touchburn, S. P., V. D. Chamberlin, and E. C. Naber (Department of Poultry Science, Ohio Agricultural Research and Development Center, Wooster, OH 44691)
Poultry Science 51, No. 1, 96-103 (Jan. 1972)

Unknown growth factors exist in a variety of feedstuffs that are required for optimum performance of poultry. The purpose of the present research work was to study the factors that affect the response of turkeys to unidentified factors in the breeder diet. A series of six experiments was carried out over a period of 6 years. These experiments were designed to determine the effect of rearing conditions, breeder housing conditions, and diet composition on the hatchability of eggs and growth of poults due to transfer of unknown dietary factors from the breeder hen diet.

Simplified starter, grower, finisher, and breeder diets were developed for this study. These diets were composed of corn, soybean meal, and pure sources of vitamins and minerals. They provided nutrients in excess of required amounts but were devoid of those ingredients commonly considered as sources of unidentified factors. These simplified diets were tested against complete diets (regular Ohio turkey diets) which contained sources of animal protein and unidentified factors. Female poults of a medium white variety were used. Oyster shell was available in the breeder pens (free choice basis).

The results provide substantial evidence for the existence of an unidentified nutrient or nutrients in fish meal and dried fish solubles required by the

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6.190 GROWTH AND PLASMA AMINO ACID PATTERN OF CHICKS FED FISH MEAL AS SOLE SOURCE PROTEIN: EFFECT OF DIETARY LEVELS OF CHLORIDE, SULFATE, GLUTAMIC ACID AND METHIONINE

Miller, David, Joseph H. Soares, Jr., and Marion Sanders (National Center for Fish Protein Concentrate, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, College Park, MD 20740)
Poultry Science 51, No. 1, 171-177 (Jan. 1972)

Two experiments were conducted with chicks fed fish meal as sole source protein from day 1 to day 21 to determine the effect (1) of lowered dietary chloride and sulfate content, (2) of additions of glutamic acid, and (3) of methionine on the growth response and on the plasma free amino-acid pattern. These treatments produced characteristic effects on growth and the amino acid concentration in the plasma, indicating complex interactions. Decreasing the chloride and sulfate in a diet containing 12% protein supplied entirely by a fish meal produced a significant positive growth response which was apparently due to the resulting increased availability of arginine and increased concentration in the plasma. Supplementation of glutamic acid (5.05%) to the suboptimal 12% protein diet resulted in an increase in plasma glutamic acid and alanine, but increased growth occurred only when the diet also contained the higher level of chloride and sulfate. The addition of glutamic acid decreased the plasma concentration of threonine, serine, tyrosine, and phenylalanine.

Methionine additions failed to increase growth unless glutamic acid was also included in the diet with the lower chloride and sulfate content. The 0.2% methionine supplement with glutamic acid produced a growth response and an increase in

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6.19 EVIDENCE FOR SULFATE AS AN UNIDENTIFIED GROWTH FACTOR IN FISH SOLUBLES

Hinton, C. F., and R. H. Harms (Department of Poultry Science, Florida Agricultural Experiment Station, Gainesville, FL 32601)
Poultry Science 51, No. 2, 701-703 (Mar. 1972)

Previous studies indicated that fish solubles were valuable additions to poultry diets by promoting growth. The value of fish solubles was attributed to an unidentified growth factor. In other work the chicken's need for inorganic sulfate had been demonstrated. However, supplements of inorganic sulfate to practical diets containing fish solubles produced no additional growth. Further investigation showed that the fish solubles in the practical diets contained sulfate equivalent to the added inorganic sulfate.

Experiments were performed to determine whether growth response of fish solubles was due to their sulfate content. Four hundred chicks were divided into groups which were fed one of the following diets: (1) basal diet without fish solubles or sulfate, (2) basal diet plus 0.2% sodium sulfate, (3) basal diet containing 3.0% fish solubles, and (4) fish solubles diet plus 0.2% sodium sulfate.

After 4 weeks, the diet containing 0.2% sodium sulfate resulted in significant additional increase in body weight of chicks over those fed the basal diet. The diet containing 3.0% fish solubles caused a similar weight gain. Supplementing the fish solubles diet with sodium sulfate caused no change in weight gain from the separate fish solubles or sulfate supplemented diets.

Since the data indicate additional chick growth caused by either fish solubles supplement or sulfate supplement are equal, the authors concluded that sulfate could be the unidentified growth factor in fish solubles.
[2 tables, 7 references] SW

4.19 (8.53)

20:5ω3 fatty acid was the major polyunsaturated fatty acid (rather than the usual 22:6ω3), and within the 18:1 fatty acid series, the ω7 isomer was present in unusually large quantities. One table gives the fatty acid composition of the lipid fractions of the muscle and viscera tissues of the queen crab (as % acids C12 to C22); another table gives the monoene isomers in the queen crab tissue lipids (isomers as % of each chain length).
[3 tables, 30 references] FTP

6.190

plasma methionine, cystathionine, and α-amino butyric acid. When 0.6% methionine was added to the diet, the plasma levels of these three amino acids were higher, resulting in a growth depression. Both levels of methionine supplements in combination with the glutamic acid caused a drop in the plasma lysine, threonine, valine, and histidine. [5 tables, 6 references] Authors' abstract

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6.195 AVAILABILITY OF THE AMINO ACIDS IN CASEIN, FISH MEAL, SOYA PROTEIN, AND ZEIN AS MEASURED IN THE CHICKEN

Filpot, Paul, Rene J. Belzile, and G. J. Brisson (Fac. Agric., Univ. Laval, Quebec, Que., Canada)
Chemical Abstracts 76, No. 15, 84718v (Apr. 10, 1972)

Although a limited number of samples were examined, it appears that certain feeds are relatively free from salmonellae. Authors' abstract

No true salmonellae could be produced on further selective media cultured from the suspected colonies. Most of the Salmonella-Shigella group was not detected in the large quantities of material cultured on the Salmonella-Shigella agar. Biochemical methods were used to identify Salmonellae and Shigellae. A considerable number of strains of Escherichia coli were also found. Further investigations were undertaken to determine the significance of these findings.

Eighteen samples of catfish feeds and ingredients, which have been analyzed by standard bacteriological methods for the presence of Salmonellae, were examined. Each of the 18 samples was taken from 50-pound bags from six 50-ton portions of feed after thorough mixing. After 24 hours, the broth was plated out on Salmonella-Shigella agar and the plates incubated for 24 hours at 37°C. Typical colonies were picked and streaked on triple sugar iron agar slants and by serological methods.

6.190

STUDIES OF SALMONELLAE POTENTIAL IN CATFISH FEEDS

Lovell, Terry, and R. D. Broadbent (Fishery Extension Service, National Marine Fisheries Service, Pascagoula, MS 39567)
Commercial Fisheries Review 34, Nos. 5-6, 49-50 (May-June 1972)

turkey for maximum hatchability. The response to the supplements containing the unidentified factors was enhanced by confinement rearing of the poults, feeding the poults simplified growing rations, and maintaining the turkeys on slatted floors or in wire cages during egg production. The response that was obtained by feeding the complete diet was shown to be due to fish meal and a dried fish solubles supplement. The unidentified nutrient(s) required for maximum hatchability is transferred through the egg to the poult and results in increased early growth of the poult. The fish factor response was observed toward the end of the reproductive period indicating a depletion of the factor from the hen during egg production. Furthermore, the factor promotes early growth when incorporated directly in the poults' diet.

The results indicate that the response to the unidentified factor in fish is not merely a response to a better balance of amino acids and that the response is not due to alterations in the microflora of the intestinal tract of the dam. Interestingly, a whey factor response was noted which seemed logically to be due to changes in the intestinal microflora of the poult.
[11 tables, 8 references] FTP

4.11 CONSECUTIVE CHROMATOGRAPHIC TECHNIQUES IN THE COMPONENT FATTY ACID ANALYSIS OF SARDINE OIL

Gedam, P. H., M. R. Subbaram, and J. S. Aggarwal
Fette Seifen Anstrmittel 73, No. 12, 748-753 (1971) (In English)
BFMIRA Abstracts 25, No. 3, Abstract No. 689, 141 (Mar. 1972)

4.11 (7.598) GAS CHROMATOGRAPHY AND ITS USE FOR ANALYZING FATTY ACIDS

Sheygaval, I. A. (U.S.S.R.)
Chemical Abstracts 76, No. 15, 80062q (Apr. 10, 1972)

7.599 (9.19) A LOW TEMPERATURE CLEANUP PROCEDURE FOR PESTICIDES AND THEIR METABOLITES IN BIOLOGICAL SAMPLES

McLeod, Harry A., and Patricia J. Wales (Department of National Health and Welfare, Tunney's Pasture, Ottawa, Ontario, Canada)
Journal of Agricultural and Food Chemistry 20, No. 3, 624-627 (May-June 1972)

This article describes a low-temperature cleanup procedure for separating polar and apolar pesticide residues from sample lipids, waxes, and water in a single step. The procedure does not require partition systems and drying agents.

The procedure consists of extracting the samples by refluxing with an acetone-benzene (19 + 1) mixture and cleaning of the extracts by low-temperature precipitation at -78° C. Optimum conditions included a precipitation time of 30 min. followed by filtration through Solka Floc (cellulose). The recovery of polar residues was adversely affected by the water content of the extract but was not affected by the presence of carbon in the Solka Floc filtration pad. This cleanup procedure (low-temperature precipitation of the water, fat, and waxes in the acetone-benzene extracts) gave a supernatant satisfactory for glc determination with electron capture and flame photometric detectors.

Recovery tests were made of 13 representative insecticides, fungicides, and herbicides (captan, diazinon, dinitrobutyl phenol anisol, 2,4-D acid, 2,4-D isopropyl ester, endosulfan, malathion, malaoxon, parathion, paraoxon, phosphamidon, fenitrothion, and fenitroxon) added singly or in combination to samples of carrots, peas, wheat, human fat, liver, and kidney. The recoveries ranged from 80 to 116%. [1 figure, 5 tables, 13 references] FTP

7.81 QUANTITATIVE AND SELECTIVE GAS CHROMATOGRAPHIC ANALYSIS OF DIMETHYL- AND TRIMETHYLAMINE IN FISH

Miller, Alexander, III, Richard A. Scanlan, Jong S. Lee, and Leonard M. Libbey (Department of Food Science and Technology, Oregon State University, Corvallis, OR 97331)
Journal of Agricultural and Food Chemistry 20, No. 3, 709-711 (May-June 1972)

Earlier work has shown that dimethylamine (DMA) is characteristically the principle methylamine produced in frozen fish of the Gadoid species. Furthermore, the presence of N-dimethylnitrosamine was demonstrated in smoke-processed marine fish (sablefish, salmon, shad); apparently, the DMA and nitrite served as precursors for the carcinogenic nitroso derivative.

In the course of studies on the gas chromatographic analysis of methylamines, several workers have found that columns containing Graphon (a partially graphitized carbon black) coated with tetraethylenepentamine (TEP) gave symmetrical peaks for methylamine, DMA, and TMA, with good resolution. In the present study, the authors examined further the detection and separation of methylamines using Graphon and TEP in conjunction with an alkali flame ionization detector (AFID) that was sensitive and selective to nitrogen compounds. They described, in this article, rapid analytical procedures for quantitative and qualitative determination of methylamines in fish, as well as other food products or biological materials.

Selective gas chromatographic separation of methylamines was achieved using columns containing Graphon and tetraethylenepentamine with an alkali flame ionization detector. "Spiked" samples of fish (the chemicals were added in amounts

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7.85 EFFECT OF TYPE OF ENRICHMENT AND DURATION OF INCUBATION ON SALMONELLA RECOVERY FROM MEAT-AND-BONE MEAL

Huhtanen, C. N., and J. Naghski (Eastern Regional Research Laboratory, Marketing and Nutrition Research Division, Agricultural Research Service, U.S. Department of Agriculture, Philadelphia, PA 19118)
Applied Microbiology 23, No. 3, 578-585 (Mar. 1972)

Tetrathionate enrichment media is recommended for isolating salmonellae from meat-and-bone meal [Appl. Microbiol. 16, 1387-1393 (1968)]. Both tetrathionate and selenite-cystine enrichment is recommended by the Food Protection Committee (National Academy of Sciences) for isolating salmonellae from foods [Reference methods for the microbiological examination of foods, NAS, Washington, D.C. (1971)]. The committee also suggests incubating the enrichment samples from 18 to 24 hours. The Food and Drug Administration [Bacteriological Analytical Manual, ed. 2, U.S. FDA, Washington, D.C. (1969)] recommends the use of both enrichment media for isolating salmonellae from animal feeds. In the present study, the authors compared the efficacy of selenite-cysteine and tetrathionate enrichment media (incubated at 1 and at 2 days) for isolating serogroups of salmonellae from naturally contaminated meat-and-bone meal samples.

Twenty-five samples of meat-and-bone meal were collected from commercial rendering plants: seven had been found to be positive for salmonella previously; of the remaining 18 samples, 16 were positive for salmonella. The samples were enriched with either selenite-cystine or tetrathionate media and incubated for 1 and for 2 days.

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7.86 (0.5) EFFICIENCY OF SALMONELLA ISOLATION FROM MEAT-AND-BONE MEAL OF ONE 300-G SAMPLE VERSUS TEN 30-G SAMPLES

Huhtanen, C. N., J. Naghski, and E. S. Dellamonica (Eastern Regional Research Laboratory, U.S. Department of Agriculture, Philadelphia, PA 19118)
Applied Microbiology 23, No. 4, 688-692 (Apr. 1972)

Sample sizes of from 20 to 30 g. have been proposed by various government research and service agencies for isolating salmonellae from foods and feeds. In this study, the efficacy of isolating salmonellae from meat-and-bone meal was examined using one 300-g. sample versus using ten 30-g. samples. Twenty-five meat-and-bone samples were used. The organisms were cultured in selenite-cystine broth and the inoculated broth samples were cultured on Brilliant Green agar plates; preliminary confirmation was made using lysine-iron agar slants, and final confirmation was made by slide agglutination tests using grouped and individual somatic antisera.

When the 300-g. samples were used, 17 meat-and-bone meal samples were positive for salmonellae; when the 30-g. samples were used, 18 meat-and-bone meal samples were positive (the difference was not significant). The 300-g. sample of meal showed a significantly higher ($P < 0.01$) percentage of confirmed salmonellae at 2 days of incubation than at 1 day of incubation. The 30-g. samples showed significantly fewer confirmed salmonella than did the 300-g. sample after 2 days of incubation, but there was no difference after 1 day of incubation. A total of 1,417 presumptive colonies were picked from the Brilliant Green agar plates; of these, 1,215 (85.7%) were lysine decarboxylase-positive and 1,152 (81.3%) were agglutinated by one of the somatic antisera. The large and the small samples

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7.45 DETERMINATION OF PARTICULATE PHOSPHORUS BY ALKALINE PERSULFATE DIGESTION

Fuhs, G. Wolfgang (New York State Dep. Health, Albany, N.Y.)
Chemical Abstracts 76, No. 15, 86065t (Apr. 10, 1972)

8.42 STRONTIUM LEVELS IN SWEDISH FISH

Bergstrom, S. O. W.
Hlth Phys. 21, No. 4, 611-612 (1971)
BFMIRA Abstracts 25, No. 1, Abstract No. 123, 27 (Jan. 1972)

Values for ^{90}Sr in perch, pike and roach taken from various named Swedish waters are given in a table. These figures show that strontium levels in muscle tissue are lower than those found in bone and skin. L.P. Reprinted

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7.42 METHOD FOR DETERMINATION OF MERCURY IN TUNA FISH (9.19)

Carlsano, A., M. Riva, and A. Daghetta
Industria Conserve 46, No. 3, 194-196 (1971) (In Italian)
BFMIRA Abstracts 25, No. 6, Abstract No. 1964, 398 (June 1972)

A method is described for determination of mercury by flameless atomic absorption spectrophotometry following acid digestion. C.C. Reprinted

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7.85

The number of somatic serogroups found per sample ranged from 1 to 11 with a mean of 3.8. More serogroup C salmonellae were isolated with the tetrathionate enrichment media than with the selenite media, and more groups G, 35, and Difco poly-valent D serogroups were isolated with selenite enrichment media than with tetrathionate media. Almost 75% of the colonies suspected of being salmonellae on the Brilliant Green (selective agar) plates had lysine decarboxylase and of those having lysine decarboxylase 94% were found to be salmonellae; there were no differences between times of enrichment, although there were significantly more total positive serogroups at 2 days than at 1 day from tetrathionate media but not from selenite media. Apparently certain serogroups preferred either tetrathionate or selenite-cystine enrichment. No differences existed in total positive samples with the two enrichments, although neither media alone was sufficient to identify all positives.

[6 tables, 18 references] FTP

7.86 (0.5) OCCURRENCE AND DETECTION OF CLOSTRIDIUM BOTULINUM TYPE E IN MARINE FISH. 2.

Baumgart, J.
Arch. Lebensmittelhyg. 23, No. 2, 34-39 (1972) (In German)
BFMIRA Abstracts 25, No. 5, Abstract No. 1588, 322 (May 1972)

Clostridium botulinum type E toxin was detected in the alimentary canal of 18 samples of fish out of a total of 252 fish (plaice, herring, cod and eel) examined. The organism itself was isolated in only 4 cases. C.S.B. Reprinted

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7.8 (3.338) DEVICE FOR TESTING CANS FOR LEAKS (LEAK DETECTOR)

Fried Krupp G.m.b.H. (Federal Republic of Germany) (pat.)
British Patent 1,265,377
BFMIRA Abstracts 25, No. 5, Abstract No. 1873, 379 (May 1972)

A rapid and accurate test for can leaks is described. The apparatus consists of a piston in a cylinder to which the can is attached. Pressure changes in the cylinder are measured when the piston is moved. Reprinted

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7.81

of 10 p.p.m. of TMA and 50 p.p.m. of DMA) were detected by equilibrium vapor analysis. The authors found that greater sensitivity (25 p.p.b. TMA and 100 p.p.b. DMA) was obtained by using the alkali flame ionization detector in conjunction with a gas entrainment, on-column trapping procedure.

[3 figures, 1 table, 19 references] FTP

7.86 (0.5)

showed no significant differences in diversity or total numbers of different somatic groups.

The authors conclude that the results indicate that it is feasible to pool several small samples into one large one for Salmonella analyses.

[3 tables, 7 references] FTP

7.86 (0.5) SALMONELLA TESTING OF POOLED PRE-ENRICHMENT BROTH CULTURES FOR SCREENING MULTIPLE FOOD SAMPLES

Price, W. R., R. A. Olsen, and J. E. Hunter (Winton Hill Technical Center, The Procter & Gamble Company, Cincinnati, Ohio)
Applied Microbiology 23, No. 4, 679-682 (Apr. 1972)

Positive results of tests for Salmonella in samples of food ingredients and products are relatively rare. Therefore, a test procedure that would give a single negative result for many negative samples would save considerable time and effort on the part of the analyst. This study involved the examination of the effectiveness of pooling pre-enrichment broth cultures for screening multiple food cultures. The tests were carried out using samples of nonfat dry milk, egg albumin, and cocoa. Pooled samples were prepared by combining nine 25-g. Salmonella-negative samples and one 25-g. Salmonella inoculated sample together in a single jar containing 2,250 ml. of pre-enrichment broth (0.5% lactose broth for all foods except nonfat dry milk for which sterile distilled water containing 0.002% Brilliant Green was used). Pooled pre-enrichment broth cultures were prepared by first combining the individual sample and enrichment broth, then pooling the pre-enrichment broth cultures into single enrichment broths. The pre-enrichment broths of the Salmonella-inoculated samples were analyzed individually and after pooling with pre-enrichments of uninoculated samples. The subsequent procedures for Salmonella analysis were the same for both sets of samples and were in accordance with those described in the Bacteriological Analytical Manual [Department of Health, Education and Welfare, Food and Drug Administration, Washington, D.C. (1969)].

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8.42 (9.19) DISTRIBUTION OF IRON, MAGNESIUM, COPPER, ZINC, AND SILVER IN OYSTERS ALONG THE GEORGIA COAST

Windom, Herbert L., and Ralph G. Smith (Skidaway Institute of Oceanography, Savannah, GA 31406)
Journal of the Fisheries Research Board of Canada 29, No. 4, 450-452 (Apr. 1972)

Fifty oysters were collected along the coast of Georgia representing different environmental conditions. The shells and the soft tissues of the oysters were analyzed for iron, magnesium, copper, zinc, and silver. It is known that bivalve molluscs (and other marine organisms) can concentrate heavy metals from the environment.

Magnesium was the only metal of the five analyzed that was concentrated in the shell. In the soft tissues, it appears that iron and magnesium are concentrated similarly, and that copper, zinc, and silver are concentrated similarly. The data seem to indicate that the concentration of the metals by the oysters is more affected by the geochemistry of the metals than by the biochemistry of the metals. The ranges of heavy metals found in the oyster shells were: Fe, 12 to 79 p.p.m.; Mn, 33 to 121 p.p.m.; Zn, 1.5 to 8.1 p.p.m.; and Cu and Ag less than 1 p.p.m. The ranges for heavy metals found in the soft tissue of the oysters were: Fe, 233 to 738 p.p.m.; Mn, 24 to 51 p.p.m.; Cu, 48 to 261 p.p.m.; Zn, 0.12 to 0.57 p.p.m.; and Ag, 28 to 82 p.p.m.
[1 table, 5 references] FTP

7.9 (9.19) TISSUE CULTURE BIOASSAY METHOD FOR WATER POLLUTION WITH SPECIAL REFERENCE TO MERCURIC CHLORIDE

Li, M. F., and G. S. Traxler (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)
Journal of the Fisheries Research Board of Canada 29, No. 5, 501-505 (May 1972)

Bioassay methods involving fish exposure and oxygen residual tests and chemical methods for determining pollutants have been proposed for monitoring water quality. However, the bioassay methods are laborious and time consuming and their sensitivity varies with the species and condition of the fish used. Chemical methods consider only a particular pollutant and cannot completely replace the bioassay method. A rapid and effective method of monitoring water quality is urgently needed. This paper reports on the effect of mercuric chloride on cellular respiration and multiplication and on those factors that govern the sensitivity of this bioassay system. Mercury and its derivatives have been implicated in serious pollution problems involving aquatic animals; mercuric chloride was used in these experiments as the representative mercuric compound.

In the cell culture and growth assay tests, mouse cells (L-cells, clone 929) were cultivated in 50-ml. spinner flasks, and the experimental system described by M. F. Li and coworkers [J. Fish. Res. Bd. Canada 26, 1378-1382 (1969) and Can. J. Zool. 48, 133-136 (1970)] was used. Also, cell respiration studies were carried out at 37° C.

The nutritional history, the growth phase, and initial density of the cells, and the concentration of the serum supplement used in the test medium, had significant effects on the sensitivity of tissue culture bioassay system. Mercuric

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8.53 (0.35) TRIACYLGLYCEROLS CHARACTERISTIC OF PORPOISE ACOUSTIC TISSUES: MOLECULAR STRUCTURES OF DIISOVALEROYLGLYCERIDES

Varanasi, Usha (Department of Chemistry, Seattle University, Seattle, WA 98122), and Donald C. Malins (National Marine Fisheries Service, National Oceanic and Atmospheric Administration, 2725 Montlake Blvd. East, Seattle, WA 98102)
Science 176, No. 4037, 926-927 (May 26, 1972)

Data are presented on the individual triacylglycerols from the melon and mandibular canal tissues of the porpoise (Tursiops gilli)--see table that follows. Diisovaleroylglycerides comprised more than two-thirds of the total triacylglycerols of these acoustic tissues of the porpoise; blubber triacylglycerols (which have no acoustic function) did not contain a detectable amount of these unusual glycerides. Because diisovaleroylisopentadecanoylglycerol was the major component in melon and mandibular canal tissues, the authors believe that it may play an important role in the transmission of sound through the lipid-protein matrices. They suggest that a study of the acoustical properties (compressibility, acoustical impedance) of diisovaleroylisopentadecanoylglycerol may provide additional clues to the role of branched-chain triacylglycerols in the construction of porpoise tissues involved in biosonar.

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7.9 (9.19)

chloride at a concentration of 10 µg./liter inhibited multiplication of L-cells significantly (under the experimental conditions used). The authors suggest that this assay procedure could be adequate for monitoring water quality.

The cellular respiration method was less sensitive than the cell culture and growth assay method, but it was simple and rapid (results were available in a few hours); therefore, the cellular respiration method may be useful for screening or the preliminary testing of heavily polluted samples.

[5 figures, 1 table, 13 references] FTP

Air is blown through the sample of oil at room temperature and the escaping air current contaminting the solvent is passed into Dräger indicator tubes for petroleum solvents or trichloroethylene. The amount of solvent is read off directly from the tube by measurement of the length of the coloured zone in the tube. The method takes 15 minutes and can detect levels down to 0.01%. It is accurate enough for practical purposes. C.S.B. Reprinted

Pardun, H., and P. Vogel
Fette Seifen Anstrmittel 74, No. 2, 69-72 (1972) (In German, English summary)
BFMIRA Abstracts 25, No. 5, Abstract No. 1566, 318 (May 1972)

7.9 (6.137) A RAPID METHOD FOR THE DETERMINATION OF SOLVENT RESIDUES IN EXTRACTED OILS

8.53 (0.35)

Chain length of acid	Triacylglycerols containing 2 moles of isovaleric acid from the acoustic tissues of the porpoise.(a)			
	Melon tissue		Mandibular canal tissue	
	Acids(b) derived from triacylglycerols	Diiso-valeroyl-glycerides	Acids(b) derived from triacylglycerols	Diiso-valeroyl glycerides
12:0 iso	0.3	0.8(d)	0.2	0.2(d)
12:0	0.2		0.3	
13:0 iso	0.4	3.0(d)	0.3	1.5(d)
13:0	0.3		0.4	
14:0 iso	2.5	6.7	3.7	10.3
14:0	3.2	8.4	4.9	12.4
15:0 iso	16.8	49.0	12.5	35.2
16:0 iso	1.5	5.8	4.4	14.9
16:0	3.7	11.1	4.7	15.6
16:1	2.4	10.9	0.5	2.4
18:1	1.3	5.3	1.6	6.8

(a) Values are in mole %
(b) Contains 65.9 mole % isovaleric acid
(c) Contains 66.2 mole % isovaleric acid
(d) Not separable

[1 figure, 1 table, 11 references] FTP

7.86 (0.5)

As many as 25 pre-enrichment broth cultures could be pooled for analysis without loss in sensitivity to detection of Salmonella as compared to individual samples. The method was also applicable to cottonseed flour, wheat flour, and shredded coconut.

The procedure is simple and effective; it offers a way to increase sample capacity in the Salmonella testing of foods. In the procedure used, small portions of the pre-enrichment broth cultures are retained for subsequent individual analyses if positive tests are found.

[1 figure, 3 tables, 4 references] FTP

Total mercury was determined by flameless atomic absorption spectrophotometry and methyl mercury by electron capture gas chromatography. Details of these methods are given. The results obtained on 50 samples of tuna of diverse origin are tabulated and their significance is discussed. C.C. Reprinted

Fabbrini, A. et al.
Boll. Lab. Chim. Prov. 22, No. 3, 339-349 (1971) (In Italian)
BFMIRA Abstracts 25, No. 6, Abstract No. 1963, 397 (June 1972)

7.42 (9.19) DETERMINATION OF TOTAL MERCURY AND OF METHYL MERCURY IN CANNED FISH PRODUCTS. RESULTS AND CONSIDERATIONS

7.81 DETERMINATION OF NITROSODIMETHYLAMINE IN THE LOW PARTS PER BILLION

Newell, John E., and Harold R. Sisken (Uniroyal Chemical, Naugatuck, CT 06770)
Journal of Agricultural and Food Chemistry 20, No. 3, 711-713 (May-June 1972)

This article describes a method for the analysis of nitrosodimethylamine (NDMA) in raw apples, cooked apples, and milk. The method is sensitive to 3 p.p.b. of NDMA and the recovery is 70% or better. The method involves five operations as follows: (1) The NDMA and other volatile components are removed from the nonvolatile components of the sample by a vacuum distillation technique; (2) the NDMA, including other organic materials, in the distillate is removed from the water by percolation through a column of polymer beads; (3) the NDMA is removed from the polymer beads by heat and carried into a gas chromatographic column; (4) the NDMA is separated from the other components by means of programmed temperature gas chromatography; and (5) the NDMA is reduced, catalytically, to ammonia and the ammonia is microcoulometrically titrated and continuously recorded. The amount of NDMA is established by the area of a peak at a specific retention time.

The authors suggest that the method should be applicable to the determination of NDMA in foods other than apples and milk, and also applicable to the determination of other volatile nitrosamines. Also, the use of the polymer beads to accumulate a few parts per billion of organic compounds from large volumes of water might be applicable in water pollution analysis.

[4 figures, 1 table, 8 references] FTP

9.17 (1.953) WHY ALL THE FUSS ABOUT WHALES?

Gambell, Ray (National Institute of Oceanography, London, England)
New Scientist 54, No. 801, 674-676 (June 22, 1972)

The International Whaling Convention, signed in 1946, set up the International Whaling Commission (IWC) to regulate the industry and to provide for the development, conservation, and optimum utilization of the whale resources. The IWC decided recently on new catch quotas, size limits, and other regulations which will govern the hunting of the large whales next year.

The aim of the IWC now is to bring all stocks to levels which will provide long-term maximum sustainable yields. Whale populations at different stock sizes and compositions have varying rates of recruitment and mortality. In an unfished stable population there is a surplus of recruits over natural mortalities, and this surplus can be harvested indefinitely without causing a reduction or increase. At a stock size generally of half the unexploited population, the surplus reaches a peak called the maximum sustainable yield (MSY). Populations smaller than the MSY stock level have a sustainable yield (SY) less than maximum. To allow this stock to rebuild, fewer than the SY must be caught.

In exploited populations, increased food availability is probably a prime factor responsible for the raised level of recruitment. A further demonstrable factor in greater recruitment rate is the reduction in age of sexual maturity. The following species are the most depleted and are protected from hunting by countries party to the International Convention: right whales, protected since 1935 and believed to be increasing in numbers; gray whales, protected since 1947, stabilized at a level of 11,000 in the eastern North Pacific; blue whales, protected

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9.19 IDENTIFICATION AND ESTIMATION OF THE MAJOR COMPONENTS OF A COMMERCIAL POLYCHLORINATED BIPHENYL MIXTURE, AROCLOR 1221

Willis, D. E., and R. F. Addison (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada)
Journal of the Fisheries Research Board of Canada 29, No. 5, 592-595 (May 1972)

The major components of Arochlor 1221, a polychlorinated biphenyl mixture, are shown in the table.

Component	Amount of component in Aroclor 1221
	wt. (%)
Biphenyl	12.7
2-chlorobiphenyl	28.4
4-chlorobiphenyl	18.7
2,2'-dichlorobiphenyl	9.2
2,4-dichlorobiphenyl	3.5
2,4'-dichlorobiphenyl	13.6
4,4' -dichlorobiphenyl	6.2
Total Aroclor accounted for	92.3
Calculated amount of Cl	19.6

The authors indicate that a report by R. G. Webb and A. C. McCall [Identities of polychlorinated biphenyl (PCB) isomers, presented at the 162nd Meeting of the American Chemical Society, Washington, D.C. (1971)] lists qualitative data on Aroclor 1221 that includes the components found by the present authors as well as some other trichlorobiphenyls. [1 figure, 2 tables, 13 references] FTP

9.19 BIOLOGICAL MAGNIFICATION OF A POLYCHLORINATED BIPHENYL (AROCLOR 1254) FROM WATER BY AQUATIC INVERTEBRATES

Sanders, Herman O., and Jack H. Chandler (Fish-Pesticide Research Laboratory, Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior, Columbia, Mo.)
Bulletin of Environmental Contamination and Toxicology 7, No. 5, 257-263 (May 1972)

Polychlorinated biphenyls (PCBs) are mixtures of chlorinated biphenyl isomers having a wide range of industrial application. Previous studies on PCBs have reported on widespread contamination of the environment, on their insecticidal properties, and on their harm to organisms in aquatic ecosystems. In addition, PCBs can be accumulated by aquatic invertebrates from the aquatic environment containing low levels of PCBs. Thus higher organisms which ingest aquatic invertebrates may be exposed to significant amounts of PCBs via the food chain.

To determine the rate of accumulation and biological magnification of PCBs, eight species of aquatic invertebrates were exposed to PCBs with labeled ^{36}Cl. The levels of PCBs in the medium were less than 3 p.p.b., a concentration similar to that in Escambia Bay, Fla. In addition to measurements of accumulation, samples of scud (Gammarus pseudolimnaeus Bousefield) were analyzed by gas-liquid chromatography to investigate metabolism of PCBs.

The organisms tested were four species of crustacea--scud, glass shrimp (Palaemonetes kadiakensis Rathbun), crayfish (Orconectes nais Faxon), a daphnid (Daphnia magna Strauss); and four species of immature aquatic insects--stonefly naiad (Pteronarcys dorsata Say), dobsonfly larvae (Corydalus cornutus Linnaeus), mosquito

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9.19 (9.15) PCBs -- THE EVASIVE CHEMICAL

Johnson, Conwell W. (National Renderers Association, Des Plaines, Ill.)
Feedstuffs 44, No. 27, 29 (July 3, 1972)

[Polychlorinated biphenyls (PCBs) are industrial chemicals widely distributed in the environment. They degrade very slowly and tend to accumulate in the food chain. Small doses can be toxic.]

Poor hatchability and high chick mortality were reported in the late summer and early fall of 1971 by poultry producers in the southeastern United States. An investigation into the causes found the toxic factor to be a shipment of fish meal accidentally contaminated with PCBs (or Aroclors). Poultry feed ingredient suppliers initiated PCB surveys to determine the extent of contamination in their products. Analysis of samples of feed ingredients from all parts of the country indicated an average PCBs contamination range of 0.09 to 0.55 p.p.m. One sample from the central United States had 2.50 p.p.m. This sample had been processed through a terminal heater where PCBs were the heat exchanger fluid. A second survey for PCBs in feed ingredients confirmed the results of the first, although levels were slightly lower.

Average PCB levels in several ingredients are as follows (in p.p.m.): hydrolyzed feather meal, 0.25; meat and bone meal, 0.09; fats and greases, 0.26. Six samples of feed ingredients held since 1965-1966 were tested for PCBs with the following results (in p.p.m.): poultry byproduct meal, 0.06; feather meal (light), 0.06; poultry fat, 0.25; blood meal, 0.04; feather meal (dark), 0.12, meat and

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9.16 LABORATORY REARING OF SPOT SHRIMP LARVAE (PANDALUS PLATYCEROS) AND DESCRIPTIONS OF STAGES

Price, Vincent A., and Kenneth K. Chew (College of Fisheries, Fisheries Research Institute, University of Washington, Seattle, WA 98105)
Journal of the Fisheries Research Board of Canada 29, No. 4, 413-422 (Apr. 1972)

The shrimp P. platyceros, because of its large size and apparent rapid growth rate in comparison to related species, may be a suitable species for mariculture. Therefore, as part of a study to determine such potential of this shrimp, the early life history of the species was examined in the laboratory. This paper reports on the egg incubation techniques used and describes the larval stages of the shrimp.

The spot shrimp were cultured from ovigerus females and eggs detached from females caught in Hood Canal, Wash., U.S.A. The authors designed a special tank to incubate the detached eggs in a recirculating sea-water system. The larvae were held for 83 days, passing through nine stages at an average of about 9 days per stage. The fifth stage was considered the postlarval stage. FTP
[16 figures, 12 references]

9.17 (1.953)

In the North Atlantic since 1960, throughout the Antarctic since 1966, and worldwide since 1967. Estimates of stock size in the Antarctic were too low--the present stock is about 7,000. There are about 1,000-2,500 blue whales in the North Pacific and a few hundred in the North Atlantic; humpback whales are protected in the North Atlantic since 1964 and in the North Pacific since 1966. Total numbers amount to a few thousand. They need continued protection; fin whale population is well below the MSY level and must be allowed to rebuild to the MSY levels that yield 10,000 per year; Antarctic sei whales are above MSY stock level and could be reduced by 27,000 to the MSY level. The catch has been reduced in 1971 and 1972 to allow the population to rebuild; sperm whales in the North Pacific because of their biology must be considered separately for each sex. The number of males is about the right level; the number of females needs to be reduced. Stocks are large in the rest of the world. The author suggests that only fin whales in the Antarctic and North Pacific require protection; the ban on all other whales is not justified. [3 figures, 1 table] SW

9.19 (9.15) MERCURY IN CANADIAN FISH

Bligh, E. G.
Can. Inst. Fd Sci. Technol. J. 5, No. 1, A6-A14 (1972)
BFMIRA Abstracts 25, No. 5, Abstract No. 1698, 345 (May 1972)

The mercury content of a number of fish from certain Canadian rivers and lakes was surveyed. The U.S. consumption of mercury in such applications as the paint industry, agriculture, pulp and paper making industry, and the presence of mercury in the aquatic food chain are considered in this study. It is concluded that the problems of mercury pollution in Canadian waters are relatively serious.
S.M.S. Rardin

9.19 (6.3) THERMAL WATER POLLUTION AND ALGAE

Eriksson, Gunnar, and Curt Forsberg (Inst. Fys. Bot., Uppsala, Sweden)
Chemical Abstracts 76, No. 20, 117256y (May 15, 1972)

9.19 (9.15)

bone meal, 0.03. These results indicated PCB's have been in the industrial environment for some time.

The author suggests that PCBs be confined to closed systems in industry and not be allowed in any food or feed production operation. He believes that levels will decrease since strict control of PCBs in industry has been established, and enzymes may slowly remove them from the food chain.
[6 tables] SW

FTP

[16 references]

It appears that some factor(s) supply. Where overgrazing did not occur, it appears that heavy localized exploitation of lobsters may lead to the overgrazing by sea urchins resulting in loss of primary productivity.

9.17 THE RELATION BETWEEN LOBSTER ABUNDANCE, SEA URCHINS, AND KELP BEDS

Mann, K. H. (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada), and P. A. Breen (Dept. of Biology, Dalhousie University, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 29, No. 5, 603-605 (May 1972)

It is shown, by example, that locally dense populations of sea urchins commonly overgraze their food (seaweeds) supply. Where overgrazing did not occur, it appears that some factor(s) other than food supply limits the population density of sea urchins, probably the mechanism of predation by lobsters. In some areas, the predators may be starfish or sea otters; in western Canada it may be the lobster. The author suggests that predation by lobsters may lead to the overgrazing by sea urchins, which in turn destroys the kelp beds.
[16 references] FTP

9.19

larvae (Culex tarsalis Coquillett), and the phantom midge (Chaoborus punctipennis Say). Daphnid were collected from laboratory-reared cultures; all other organisms were collected from nearby streams and ponds.

The rate of uptake and biological magnification was rapid for most of the invertebrates but not so rapid for insects. For example, the daphnids were exposed for 4 days to water containing about 1.1 p.p.b. of PCBs. They accumulated total body concentrations 48,000 times greater than those in the water. Mosquite larvae in water containing about 1.5 p.p.b. of PCBs accumulated 19 p.p.m. within 24 hr., a 12,600-fold magnification. The larvae continued to accumulate PCBs until the 7th day of exposure when they metamorphosed into pupae. The pupae showed no symptoms of toxicosis but many were not able to metamorphose into the adult form. Control larvae pupated successfully. Scud exposed continuously to about 1.6 P.p.b. of PCBs for 14 days reached an equilibrium concentration 27,000 times that in water. Crayfish accumulated PCBs at a much slower rate than all the organisms tested. In the analysis of PCBs metabolism by scud, results indicate that reductive dechlorination did not occur. [2 figures, 2 tables, 14 references] SW

9.16 LARVAE REARING TANK AND CIRCULATION SYSTEM FOR FISH CULTURE

Sanders, Graham Hodge (Elizabeth City, NC 27909); assignor to Oceanography Mariculture Industries Inc., Riviera Beach, FL 33404 (pat.)
U.S. Patent 3,661,119 (May 9, 1972)

This invention concerns a fish larvae rearing tank and a water circulation and filtration system that provides a rapid exchange of water in the larvae tank. FTP

9.3 THE PREPARATION OF ARTICLE 1 OF THE CONVENTION ON THE CONTINENTAL SHELF

Oxman, Bernard H. (U.S. Department of State, Washington, D.C.)
Journal of Maritime Law and Commerce 3, No. 2, 245-305 (Jan. 1972)

This paper is an examination of the background of Article 1 of the Convention on the Continental Shelf as revealed by the official records of the International Law Commission and the 1958 United Nations Conference on the Law of the Sea. Articles 1 and 2 of the Convention are as follows (The two articles have a textural and historical bearing upon each other):

Article 1

"For the purpose of these articles, the term "continental shelf" is used as referring (a) to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas; (a) to the seabed and subsoil of similar submarine areas adjacent to the coast of islands.

Article 2

1. The coastal State exercises over the continental shelf sovereign rights for the purpose of exploring it and exploiting its natural resources.
2. The rights referred to in paragraph 1 of this article are exclusive in the sense that if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities, or make a claim to the continental shelf, without the express consent of the coastal state.

(over)

9.3 FLORIDA'S SEAWARD BOUNDARIES -- A DILEMMA

Scott, Marshall S.
Sea Grant Technical Bulletin No. 20, University of Miami Sea Grant Program-NOAA Sea Grant No. 2-35147 (Jan. 1972), 114 pp. Price $3.00. Available from Information Services, Sea Grant Institutional Program, University of Miami, Box 9178, Coral Gables, FL 33124.

An important part of this review of a series of disputes between the Federal Government and some coastal states over ownership of the tidelands are the definitions of terms used to describe details of the coast.

The "baseline" follows the mean low-water mark of the shoreline. On the landward side of the baseline lie the "inland waters." On the seaward side of the baseline the "territorial sea" extends, for most states (of the United States), 3 miles out. Most nations exercise some form of jurisdiction over territorial sea to 12 miles seaward of the baseline. In another context the sea between the 3-mile boundary line and the 12-mile line is called the "contiguous sea," and beyond the 12-mile line the "high seas."

One of the earliest cases in regard to coastal lands caused the Supreme Court to rule in 1845 that the individual states owned submerged lands seaward of the inland waters. The Federal Government began to dispute the applicability of this ruling in the 1930's, and claimed ownership of the tidelands. The continuing disputes between the states of California, Texas, and Louisiana and the Federal Government, in the Supreme Court and in the Congress, culminated in the Submerged Lands Act of 1953. This act granted the coastal states ownership and proprietary powers of lands (tidelands) under navigable waters for a distance of 3 miles into the Atlantic and Pacific Oceans and 9 nautical miles in the Gulf of Mexico. Since

 (over)

9.3 SEABED BOUNDARIES BETWEEN COASTAL STATES: THE EFFECT TO BE GIVEN ISLETS AS "SPECIAL CIRCUMSTANCES"

Ely, Northcutt (Washington, D.C.)
International Lawyer 6, No. 2, 219-236 (Apr. 1972)

This paper is concerned with the effect to be given small islets in the determination of seabed boundaries (1) between coastal States that are adjacent to one another on the same coast or (2) between coastal States which occupy opposing coasts. The basic question involved is whether a State which owns a little island off its mainland coast or the coast of its neighbor may demand that the coast of its islet, rather than its mainland, be the baseline from which the seabed boundary shall be computed, as against that neighbor. This problem may arise in the demarcation of median or equidistance lines. The subject is discussed under the following areas: The Problem; The Nature of Rights in the Seabed and Subsoil; Baselines and Equidistance Principle; Treatment of Islets in the Literature; Practice of States; and Guidelines for Solutions.

The author suggests that in those cases in which islets are denied recognition as basepoints for the calculation of a median or equidistance line in the demarcation of seabed boundaries (because of their small size and distance from their owner's major territories) their "special circumstances" can be met be recognizing that another State cannot extend its continental shelf rights into the seabed and subsoil underlying the waters of the islet's contiguous zone; only the State owning that islet can explore and exploit the seabed resources that are within its contiguous (12-mile) zone.

[13 footnotes] FTP

9.3 THE LAW OF THE SEA -- BREAKERS AHEAD

Butte, Woodfin L. (University of Texas, Austin, Tex.)
International Lawyer 6, No. 2, 237-257 (Apr. 1972)

The events leading to and following the United Nations Resolution calling for a Conference on the Law of the Sea some time in 1973 are discussed. The author recommends that this country take and publicize certain positions, some of which are objectively stated as follows: (1) Many of the subjects proposed for the 1973 Law of the Sea Conference are already settled international law. (Possible changes in these settled rules of international law may be discussed; but if changes are not agreed upon, we are not left with no law--the law stands as it is.); (2) it is settled international law that the permissible breadth of the territorial sea of states depends upon international law, not upon unilateral declaration of each coastal state; the maximum breadth of the territorial sea so far accepted in international law is 12 miles; (3) the ocean space outside territorial waters is high seas, with its own particular rules of international law; (4) it is settled international law that each coastal state has sole jurisdiction over resources on and under its continental shelf; this continental shelf may extend to the farthest seaward extension of its continental land mass; and (5) it is believed that the 1958 Geneva Convention on Fishing and Conservation of Living Resources of the High Seas, if adhered to, offers the best means of accommodating the interests of coastal states and distant-water fishing states in conservation of essential fishery resources as a permanent resource for mankind.

[36 footnotes] FTP

9.3 THE 1973 CONFERENCE ON THE LAW OF THE SEA IN THE LIGHT OF CURRENT TRENDS IN STATE SEABED PRACTICE

Auburn, F. M. (Faculty of Law, University of Aukland, Aukland, New Zealand)
Canadian Bar Review 50, No. 1, 86-109 (Mar. 1972)

The United Nations Conference on the Law of the Sea dealing with a seabed regime and related issues is scheduled to convene in 1973. Because this conference sets an early date for the possible conclusions of a seabed treaty, the author reviews here progress to date with an examination of some current problems of state seabed practice. The report covers the following subject areas: The seabed Committee and the General Assembly, Continental Shelf Delimitations, State Practice in Municipal Law, Red Sea Brines, and Manganese Nodules.

In conclusion, the author states that the Declaration (of the seas and oceans to be the common heritage of mankind) and Moratorium Resolution (Pending the establishment of an international regime, states and persons were bound to refrain from all activities of exploitation of the resources of the seabed and ocean floor and the subsoil thereof beyond the limits of national jurisdication, and no claim to any part of that area or its resources should be recognized) of the General Assembly of the United Nations of December 1970 represent considerable progress towards an international seabed regime. But, he indicates that much of the debate on the seabed issue has been in the form of draft regimes and protracted quarrels over seats on the Seabed Committee. Furthermore, few states have a clear concept of their own national policy regarding an ocean regime. Exploration and exploitation of the seabed will continue and by 1973 states will have vested interests in petroleum concessions far below 200 meters, in brine (metalliferous) concessions at more than 2,000 meters, and in manganese nodule ventures at 6,000 meters. The author suggests that the conclusion to be drawn by the Seabed Committee is that time is running out. [149 footnotes] FTP

9.3 EFFECTS OF TRAWLING IN DISCOVERY BAY, WASHINGTON

Reeves, J. E., and G. S. Didonato (State of Washington, Department of Fisheries, Management and Research Division)
Technical Report No. 8, Washington State Department of Fisheries (Apr. 1972), 45 pp.

Trawl fishery regulations in Discovery Bay, Wash., were changed in November 1967. The changes added fishing periods and opened additional areas to trawling. These changes intensified an existing recreational-commercial fishery conflict. A study was undertaken to provide information that could alleviate the conflict.

The major species comprising the trawl catch are English sole (Parophrys vetulus), Pacific cod (Gadus macrocephalus), and starry flounder (Platichthys stellatus). The average trawl catch of these bottomfish has been 165,000 lbs. annually. The changes in the regulations have resulted in catch increases per unit effort of the commercially caught species. Based on tagging studies and logbook records an effort was made to assess the effects of fishing the English sole, the main groundfish in this fishery. The result of the assessment indicated that the level of trawling effort for English sole has never overfished the stock. Almost all sport fishermen were after salmon (Oncorhynchus species), but they expressed concern over depletion of bottomfish species. Sport fishermen were also concerned regarding trawl gear on eel grass beds and discarding of incidental herring (Clupea pallasi) found in the nets. Observations revealed that eel grass beds were inshore of the depths fished by the trawl fleet. Fouling of the beaches with discarded fish did not materialize.

The results of the study indicate: (1) The English sole is not being overfished by commercial fishermen, (2) sport fishermen are not in competition with commercial fishermen for any species, (3) these two types of fishing are compatible and (4) optimum utilization of the bottomfish resources of Discovery Bay was made possible. [8 figures, 20 tables, 12 references] SW

9.3

3. The rights of the coastal State over the continental shelf do not depend on occupation, effective or notional, or on any express proclamation.
4. The natural resources referred to in these articles consist of the mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species, that is to say, organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil."

The historical debate concerning the outer limit of coastal State jurisdiction revolved around four separate textual elements of article 1, namely, (1) the term "continental shelf," (2) the word "adjacent," (3) the inclusion of the 200 meter criterion, and (4) the "depth of exploitability."

This study is in three parts; the remaining two parts will be published in the April and July issues of this journal.
[193 footnotes] FTP

9.3
the law of 1953, because of the difficulties in establishing the geographical basis for a boundary line (such as a mean low-water mark), no coastal state's seaward boundaries have been completely defined.

Florida has the greatest tidal coastline of any mainland state, approximately 8,426 statute miles. The presence of oil deposits in offshore waters and inland has been confirmed. Consequently the financial future of Florida is joined to a pending lawsuit vis-à-vis the Federal Government which will seek to determine the precise delineation of the seaward boundaries which separate state owned seabed from the continental shelf under Federal control.

The difficulties in determining the seaward boundaries lie in the variety of the bays, islands, swamps, estuaries, flats, tidal currents, and other geographical features of the coast line. In addition, historic court decisions and old U.S. Coast and Geodetic charts may define the boundaries incompletely or incorrectly. Use of this old information for geographical references will tend to increase the controversies. SW

9.3 THE THREE-MILE LIMIT: ITS JURIDICAL STATUS

Anonymous
Valparaiso University Law Review 6, No. 2, 170-184 (Winter 1972)

This note is an analysis of the 3-mile territorial sea limit as an existing rule of international law including (1) the historical background of the rule, (2) the international history of the rule, and (3) the influence of the rule upon the international community. The note suggests that we have reached a state where the 3-mile limit has become obsolete, has been abandoned by state practice, and has not retained the general consent which gave rise to its resolution as customary law. [77 footnotes] FTP

9.19 METHYL MERCURY IN THE FOOD CHAIN OF NATURE

Nuorteva, P.
Naturw. Rdsch., Stuttg. 24, No. 6, 233-243 (1971) (In German)
BFMIRA Abstracts 25, No. 5, Abstract No. 1700, 345 (May 1972)

The incidence of methyl mercury poisoning throughout the world is well documented with numerous references. C.S.B. Reprinted

9.19 THE EFFECT OF LOW LEVEL PESTICIDE FEEDING ON THE FERTILITY AND HATCHABILITY OF CHICKEN EGGS

Sauter, E. A., and E. E. Steele (Department of Animal Industries, University of Idaho, Moscow, ID 83843)
Poultry Science 51, No. 1, 71-76 (Jan. 1972)

White Leghorn hens were fed low levels of pesticides to determine the effects of these chemicals on the fertility and hatchability of the eggs produced. Ninety-six pullets were housed in individual laying cages in this 10-week feeding experiment. Leghorn pullets housed under similar conditions in a separate building were used as controls. The pullets were fed a commercial breeder ration; DDT, Diaginon, lindane, and malathion were added to the feeds at 0.1, 1.0, or 10.0 p.p.m. levels.

Two hatch tests at an interval of 4 weeks were incubated in order to determine the levels of fertility and hatchability prior to feeding the pesticides. Pretest (prior to feeding pesticides) fertility level averaged 95% and hatchability averaged 92% of fertile eggs. The fertility during the experimental period of pesticide feeding ranged from 96.1 to 99.0%. During the experiment, the hatchability of the control test group was 94.1%. All pesticides at the levels used, except malathion at the 0.1-p.p.m. level, significantly reduced hatchability. The thickness of the shell of the eggs produced was reduced by feeding the hens lindane or DDT. All pesticides fed reduced the amount of egg production.
[8 tables, 8 references] FTP

9.17 (1.93) WORLDS LARGEST GREEN TURTLE COLONY PROTECTED

Anonymous
Marine Pollution Bulletin 3, No. 5, 67-68 (May 1972)

Europa Island, between southern Africa and Madagascar has been declared a maritime national park. The French authorities have acted to protect the world's largest green turtle nesting colony.

Mr. George R. Hughes of the Oceanographic Research Institute, Durban, assisted by the World Wildlife Fund studied the situation of the green turtle in the southeast of Africa. These studies showed the importance of the Island of Europa for the seriously threatened green turtle.

Five new maritime national parks have been established in southern Africa as a result of studies by Mr. Hughes, and four more containing turtle nesting beaches are under consideration. SW

9.6 THE STERN TRAWLER

Hjul, Peter (editor)
Published by Fishing News (Books) Ltd., West Byfleet, Surrey, England (June 1972), Price £8.50, postage 30p.
Anonymous
Fishing News, No. 3075, 11 (June 2, 1972)

This book is a survey of the changes in recent years from side to stern trawlers in the fishing fleets of the world. The subjects deal with the development of the stern trawler; increasing mechanization of gear handling; handling and processing of the catch; notable small stern trawlers; and shelter deck stern trawlers produced in 17 countries since 1963. The text is illustrated by 260 photographs and designs, and contains 21 tables. SW

9.6 THE FISH RESOURCES OF THE OCEAN

Gulland, John (editor)
Published by Fishing News (Books) Ltd., West Byfleet, Surrey, England (June 1972), 288 pp.; Price £10.50, postage 30p.
Anonymous
Fishing News, No. 3075, 11 (June 2, 1972)

This book represents a compilation of the world's total resources in pelagic and demersal fish, molluscan, and crustacean stocks. It was prepared by members of the Fishery Resources staff of the FAO. It treats in detail the catches and stocks in six Atlantic areas, six Pacific areas, the Mediterranean and Black Seas, the Indian Ocean, and the Antarctic area. This book will help in answering questions of fishermen, vessel owners, and processors seeking new resources, species, and underexploited areas. SW

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